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ABSTRACT

Contributors' papers include: an overview (Lawrence A. Hough); the federal role (David Breneman); forecasting the stocks and flows of degree holders (Douglas L. Adkins); medical education's response (Bernard Nelson); long-term approach to graduate education student financial assistance (Kurt L. Kendis); needs analysis at the graduate and professional level (Dwight H. Horch); and graduate and professional education and the public interest (Stephen P. Dresch). Commentaries are by Richard J. Ramsden, George A. Russell, George Weathersby, and James A. Hau. A list of selected readings is included. (MSE)

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Developments in the Financing of Graduate Education

June 1977

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DEVELOPMENTS IN THE FINANCING OF GRADUATE EDUCATION

A Symposium sponsored by the Student Loan Marketing Association

June 28, 1977
Washington, D.C.

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FOREWORD

Developments in the Financing of Graduate Education, a symposium sponsored by the Student Loan Marketing Association (Sallie Mae), is the initial attempt by the corporation to bring together a select group of experts to focus on the contemporary issue of postsecondary education. The problems associated with financing graduate education bear analysis from the perspective of several different disciplines and deserve to be periodically reviewed in the interest of stimulating public discussion. The following papers are of general interest in that they attempt to review the current status of graduate education finance, explore those variables that impact developments in this area and suggest appropriate public policy alternatives. Sallie Mae hopes that this volume will stimulate the discussion of problems of graduate education finance and will contribute in some small measure to the resolution of those problems.

INTRODUCTION

We all share a common interest in the topic of financing graduate education. This volume, published by Sallie Mae, presents a variety of perspectives associated with the financing and advancement of graduate education in the United States today. Now is a particularly good time to explore this topic in depth: We have a new Administration, a new Congressional leadership. But more importantly, there has been a dramatic growth of public interest in the costs and benefits of postsecondary education. And surely this interest extends to our graduate and professional schools.

As we are all too well aware, the cost of advanced training is going to be significantly higher in the future. Further, with the current limitations on Federal and state funds, and cutbacks in private philanthropy, this combination—high cost and limited financial resources—may well inhibit the career choices of many Americans. Yet advanced training in the social sciences, the physical sciences, and the professions is an acknowledged strength of the American social and economic system.

From the perspective of a supplier of loan funds for postsecondary education, Sallie Mae is vitally interested in the questions posed by these developments. One response of the corporation has been to establish a formal long-range planning process to support our financial and program efforts. The focus of this process is to identify and analyze those social, economic, demographic, and legislative trends that will have an impact on the constituents we serve and, therefore, affect Sallie Mae's future business activities. In utilizing the corporation's resources to develop a broader understanding of these influences, we have developed a keen interest in the problems of financing graduate education. This volume explores some of the more pressing issues in this area.

On a pragmatic basis, where is the money going to come from? To whom will it flow? And on what terms? On a philosophical or social basis, what effect will this have on employment opportunities, manpower needs, and the financial health of students and institutions? Within the context of our own business, we have watched student loans become a primary source of financing for graduate and professional students, filling the gap between available resources and costs. But why is this happening? Are loans to become the preferred vehicle for meeting graduate educational expenses?

Sallie Mae has no preconceived notion of what the future should look like with regard to graduate and professional education. What we do

know is that there is a complex set of interrelated factors that have given rise to the trends we see today. The participants in Sallie Mae's symposium either as contributors, commentators, or guests have helped in clarifying and analyzing these factors, and have added an extra dimension to our knowledge of the issues and left us with a greater capacity to respond to the problems we all face.

Edward A. Fox
President

OVERVIEW

Lawrence A. Hough

This paper reviews the factors partially responsible for the escalation of costs in higher education. Included in this review are statistics on the enrollment decline in high school and the consequent changes in enrollments of undergraduates and graduates. Changes in enrollment patterns along with the extraordinary forces of inflation and their effect on spiraling tuition and other budgeted costs underlie this paper's findings that the cost of a four-year private college education could exceed $62,000 for a freshman entering school in 1986. Also described is the role of the Federal government's student aid programs and its apparent positive policy of holding down the amount of dollars borrowed under the major Federal educational loan programs. Notwithstanding the Federal role in the past, the incidence of high debt levels among undergraduate students attending private institutions is noted. The paper concludes with a prediction of rapidly rising debts among students attending public institutions.

Sallie Mae is presently the largest of the more than 19,000 institutions holding an estimated $5.5 billion in outstanding guaranteed student loans. As of June 1, this corporation had loan investments totaling $432 million, and had disbursed $533 million to participating lenders as part of its purchase or warehousing program activities. In its first four years, Sallie Mae has worked steadily toward creating a viable secondary market as its contribution toward expanding the accessibility of educational loans to eligible student borrowers. In this short time period, it has reached active lenders in 36 different states and dealt with every type of lender in the guaranteed loan program; that is to say, with thrift institutions, commercial banks, credit unions, state lending agencies, and educational institutions. By year-end 1977, Sallie Mae anticipates that its student loan assets, including notes pledged as security to warehousing advances, will constitute about 10 percent of the present total outstanding volume of student loans. Loans purchased will include the obligations of nearly 125,000 student borrowers. I continue to describe the Sallie Mae experience of the past four years, and in so doing, increase the general understanding of the number of obstacles that have been overcome in establishing a secondary market for the 28 different state, Federal, and private guaranteed loan programs. However, instead of looking at where Sallie Mae has been, it might be instructive to look at

some of the future problems that must be addressed in considering the financing of higher education.

So far, Sallie Mae's analysis has relied heavily on the publications of the Carnegie Commission, the American Council on Education, the National Board on Graduate Education, the National Center for Educational Statistics, and the National Research Council. While the trends found may not be new, the preliminary conclusion that future loan demand could dramatically increase in the near future is worth careful consideration. Such an increase would reverse recent trends; the number of new loans originated annually in the two major loan programs has remained fairly stable since 1973. Moreover, the supply of credit to meet this increased demand may not be available from traditional lending sources. Equally significant, the guaranteed student loan itself has certain characteristics that may limit its effectiveness at higher levels of individual student indebtedness.

As most observers realize, the number of graduating high school students seeking higher education will soon decline from the postwar baby boom. Statistics on projected enrollments of senior high school students illustrate this trend. High school enrollments are expected to begin to decline by 1978 and continue downward each successive year through 1984. The drop in numbers during this period is substantial: the 1977 level is 15,700,000, the 1984 forecast is 13,300,000, a seven-year decline of 15 percent or 2,400,000 students. Stated in another way, the high school enrollment in 1984 will have fallen back to the 1966 level.

Logically, enrollments in institutions of higher education will decline proportionately if the traditional social and economic forces compelling high school students on to higher education are no more significant than they have been in the past. Figures published by the National Center for Educational Statistics suggest that four-year institutions will be especially vulnerable to the impact of reduced numbers of high school graduates. New enrollments in four-year institutions have been increasing steadily for years, but the situation is about to change. Between 1967 and 1971, new enrollments expanded 10 percent. Between 1972 and 1976, the growth was 9 percent. However, between 1977 and 1981 enrollments are expected to decline 2 percent. So, by 1985, actual enrollments will decrease 160,000 from the 1977 level.

The same data applied to total graduate student enrollments at four-year institutions show a continuing overall expansion in the next five years but the 5 percent growth rate is only half of the rate of the prior two five-year periods. The overall graduate enrollment will have begun to decline by 1983. It should be emphasized that these data ignore the shifts that are or will be occurring in specific academic disciplines. Hidden in the figures of increasing total graduate enrollments may be sharp declines in specific disciplines.

Statistics that indicate the forthcoming enrollment decline might lead one to conclude that the slower rate of enrollment expansion and eventual decline in actual numbers will lessen the need for state or Federal

student aid. Actually, the decline will create new pressures on the already spiraling costs of higher education. Between now and 1985 enrollment in four-year institutions will decline by 320,000 students. This reduction is clearly not going to be evenly distributed among all colleges and universities or among the various academic disciplines. Fixed costs, including salaries and related benefits, dominate the cost structure of our colleges and universities. With enrollments predicted to decline and already dropping in certain disciplines, administrators have a limited number of options. In the short term, the pressure for tuition increases will be very strong. In the longer term, the attrition of tenured faculty may reduce the fixed cost base, but should this occur too far in the future, drastic steps, including the elimination of some disciplines, might be necessary. A sort of Darwinian evolution leading to a smaller and stronger number of institutions appears to be forthcoming. The word "stronger" is used reluctantly: in a real sense, the loss of some institutions and the possible elimination of certain academic disciplines may not, in fact, leave us with an improved system.

There is no evidence that anyone has seriously attempted to measure the cost impact of enrollment declines. In the public sector the cost impact of the decline might be absorbed by larger tax subsidies. In the private sector, the cost impact may be disproportionately severe on some institutions and go nearly unnoticed in others. Some suggest that for both public and private institutions, the effect of the decline will be more than offset by large enrollments of part-time, noncredit students. While not wishing to discount this latter suggestion entirely, I believe the private sector would be especially vulnerable if it relied too heavily on this possibility.

Let me turn now to a Sallie Mae analysis of the probable future costs of a four-year education. Findings indicate that a freshman entering school this fall will require a total of about $12,000 for a four-year public university education, and from $23,000 to $33,000 for four years at most of the private colleges and universities. Using conservative estimates for cost increases, a freshman entering ten years later will require nearly twice these resources: more than $21,000 for four years in public universities, and from $46,000 to an incredible $62,000 at private institutions. Certainly these figures deserve some elaboration and should be discussed further. But for now, let me indicate that this analysis used rates of increase that ranged from four to seven percent, and based the determination of costs on an analysis of national inflation rates and the specific levels of cost increases for all student charges; that is, tuition, room and board, and miscellaneous expenses. While a six or seven percent rate of increase may seem high as an average future inflation rate, it can be justified by a comparison of historic educational expense growth rates with the Consumer Price Index (CPI). First of all, the CPI since 1967 has increased at an annual rate of 5.8 percent. Second, in nine of the last eleven years, increases in student charges at private universities exceeded the CPI. At public universities, student charges increased

faster than the CPI in seven of the last eleven years. Moreover, many of the expense categories comprising large portions of the total per student charges will continue to rise at rates exceeding the CPI. One major research university uses the following assumptions for its long-term forecast: salary and benefit increases, 2 percent above the CPI; library acquisitions, 3½ percent above the CPI; and energy, 4 percent above the CPI. So although the six or seven percent rate increase in the analysis may seem alarming, it is not overstated. The student budget for your third grade child's four-year education beginning in 1986 may well average $21,000 at a public institution and $46,000 to $62,000 at a private institution. It may even be higher.

The portion of these enormous cost figures that cannot be met by the student and his family may be drawn from state and Federal sources of direct grant support, and, as has been the case traditionally, from the various loan programs. Both grant and loan programs will be increasingly important as costs increase and more families seek assistance. Appropriations must not only meet the incremental increased costs for those already receiving aid, but must also provide for the growing numbers of middle or upper-middle income families who have neither adequate discretionary incomes nor sufficient savings. In a preliminary attempt to gauge the readiness of state and Federal programs to meet this demand, Sallie Mae looked at the recent funding levels of existing programs.

Between 1968 and 1972, grants from all sources—states, Federal BEOG and SEOG programs, VA grants, and Social Security benefits—totaled $7.5 billion, or $1.40 for each dollar of loan assistance. In the past five years, including the monies appropriated for the academic year 1977-78, state, BEOG and SEOG grants increased 339 percent over the 1968-72 level—an increment of over $6 billion. VA grants and Social Security benefits rose an estimated 160 percent. In total, grants from all sources added $23.5 billion to the resources of students and their families between 1972 and 1977—nearly three dollars of grant assistance for every dollar of loan assistance. Therefore, since 1973, the huge billion dollar plus annual increments of support for the various grant programs seem to have offset the need to borrow, at least from a national perspective. The extent to which grants can continue to offset borrowing by undergraduates is dependent on the ability and willingness of states and the Federal government to sustain the present funding level, and each year add the additional amounts necessary to offset the increases in educational costs and support the expanding numbers of students qualifying for assistance.

For the most part, these observations on the growth in grant support over the last five years have considered student aid resources flowing largely to undergraduate students. A much less favorable situation exists for graduate students. Among the many measures of decline in graduate grant support, one is especially important to Sallie Mae. Our review of data from the National Research Council makes it very clear

that loans and other sources of funds are becoming increasingly important and are being used to replace funds that had formerly been supplied through Federal fellowships, traineeships, and research supported assistantships.

Up to this point, this paper has developed an explanation for the national pattern of loan usage which, as indicated, appears to be growing less rapidly than the demand for all forms of student assistance, especially among undergraduates. However, it should be noted that the enormous amounts of grant support that have flowed into the system may have held down the demand for loan programs. There is concern about whether the states and the Federal government will continue this level of support, especially as the educational institutions face the added burden of the cost impact of declining enrollment on tuition, room, and board. In many respects, this situation for undergraduates is analogous to the situation faced by graduates six years ago. Then, priorities were shifted away from fellowship support to loans and other sources of funds. This shift away from grant support at the undergraduate level, coupled with rising costs, declining enrollments, and the already heavy reliance on loans among graduate students, leads one to conclude that loan demand will soon expand substantially.

At this point, let us return to what some may regard as a glaring oversimplification. Patterns of student assistance, when viewed from a national perspective, can overlook some very important problems occurring in some of the sectors comprising our system of higher education. This is certainly the case with respect to recent undergraduate use of educational loans. The borrowing requirements for undergraduate students with financial aid at the vast majority of all private universities and colleges are already at the level one might expect in public institutions five or ten years from now. Perhaps as many as 50 percent of the students entering private colleges and universities this fall will be in debt when they graduate in 1981. An average indebtedness of $5,000 for these students is not at all unlikely. The student aid recipient of succeeding graduating classes from private institutions will probably carry debts averaging at least 15 percent higher each year. To go back to the example of the future costs at four-year institutions, the choice of enrolling in a private institution in the fall of 1986 may include consideration of a financial aid package that will lead for many to a debt of $15,000 by graduation time four years later, triple the indebtedness of the student aid recipient in the class of 1981.

One need not even look that far into the future to determine the implications of such substantial debt loads on institutional selection and choice of academic discipline. One private university has begun to look at the relationships between the debt levels of their undergraduates and the subsequent selection of career, timing of further education, and choice of academic discipline. While the results are not yet conclusive, students seem to rule out certain educational or career alternatives because of their recognition of the obligation to repay the loans used in

financing their undergraduate education. Research on the implications of increasing debt levels is significant but appears to have been neglected since the studies conducted by the Ford Foundation under Bruce Johnstone in 1972. The many unanswered questions concerning undergraduate borrower behavior and attitudes toward graduate education are complicated not only by debt burdens but also by uncertainties in the academic and research job markets for doctoral recipients. Will there be a lost generation of scholarship in certain disciplines, as some leaders have suggested? Where enrollments and research funding are declining there is a danger that vital areas of scholarship will be neglected.

The potential problems of the increasing debt burden on undergraduate and graduate students should prompt educators and policy makers to study more closely the question of whether or not the present loan programs can be improved to lessen the impact on the career or course selection decisions. Also, the Guaranteed Student Loan Program and the Health Professions Guaranteed Student Loan Program authorized by the Health Professions Educational Assistance Act of 1976 may not be properly structured to meet lenders' expectations of return on investment. Research in this area will aid in determining whether or not the predicted large individual loan commitments will actually be made. There are also some questions as to whether the repayment terms are best suited to the larger repayment obligations. Are there certain features that can be incorporated into the terms of the loan to ease the repayment burden without increasing the program cost to the Federal government? In this context, there are proposals to extend the repayment term to 15 or 20 years; others to provide graduated repayment schedules tailored to an individual's salary or to a cohort group's expected salary; still others to provide a year of slippage in repayment terms—that is, a one-year automatic extension available at the borrower's option should circumstances justify it.

There is an increasing awareness of the need to upgrade the financial counseling of prospective borrowers. This type of personal financial planning is badly needed, and is described in more detail in Kurt Kendis's paper. This counseling may be especially important to the present group of students contemplating graduate school options in disciplines where future employment prospects are not promising.

Thoughtful discussion of problems associated with financing higher education is vital to providing financial support. This volume is evidence of the interest in tapping those individuals and organizations whose expertise in postsecondary education is acknowledged while at the same time, contributing to the process of finding answers to our graduate education financing problems—answers that will support the objective of maintaining and strengthening the nation's higher education facilities.

Lawrence A. Hough, formerly Assistant Vice President of the Student Loan Marketing Association, is now Vice President of Hough Manufacturing Corporation of Janesville, Wisconsin.

PART I: CONTRIBUTORS

THE FEDERAL ROLE

David Breneman

Dr. David Breneman traces the Federal role in support for graduate education from its peak during the Kennedy-Johnson administration to the more austere programs of the present. Forecasting the response of enrollment levels to Federal program funding is inexact at best, as evidenced by the stability of Ph.D. output and total graduate enrollment despite the recent period of decline in Federal support. Dr. Breneman also notes the absence of a separate central agency to coordinate Federal graduate programs either in the period of their expansion or in the period of their threatened demise. In assessing the future of graduate education Dr. Breneman finds continuing support for the competitive resource allocation process which, when combined with other evidence, establishes that quality will remain a primary consideration in funding graduate education. Dr. Breneman predicts that the Federal role will remain stable except for modest efforts to increase graduate support in certain national interest areas and the general trend toward increased reliance on debt-financed graduate education.

Graduate education in the late 1950s and through much of the 1960s was the dominant and most vital part of the postsecondary education scene in Washington. The forms of aid that were forthcoming from the numerous Federal agencies hardly need recital. Each agency vied to bring forward fellowships, traineeships, and training grants. The number of students supported on research contracts was also large and growing.

During this period, the driving force behind Federal policy was the manpower argument and the shortage of skilled talent. We will be hearing considerably more about that topic from Dr. Adkins.

From the last year of Lyndon Johnson's administration and through much of the last eight years a remarkable turnaround occurred. The manpower rationale began to crumble somewhere in the late 1960s. I remember the Modern Language Association's annual meeting in Denver in 1969, which first brought to public attention the fact that Ph.D.'s were chasing department chairmen for jobs. At that time, I was doing research at the University of California at Berkeley on economic aspects on university administration. I started my dissertation in 1968 on the question of what could be done to eliminate dropouts and stretch-outs in doctoral programs because of the tremendous shortage of

Ph.D.'s. A year later when I was finishing up, I had to do a chapter on what we were going to do about the emerging surplus. The market turnaround was that dramatic.

With that change, it became apparent that there was an absence in Washington of an effective lobby for graduate education. In the space of a few short years in the early 1970s, the support structure that had been created during the Kennedy-Johnson era had largely disintegrated. Offices of graduate education within the various agencies were simply eliminated. The Federal fellowship effort plummeted like a rock. One of the few remaining programs was the 500 plus awards that the National Science Foundation provides annually.

The traineeship programs of the various agencies were mostly eliminated. The NIH training grants, which support large numbers of students in the biomedical and behavioral sciences, have lived a precarious existence, first slated for elimination and then saved at the eleventh hour by Congress, although phased down significantly. But once again, none of this is new to you. I will not belabor it.

There is another trend going on, very evident at HEW. That is the tremendous shift toward concern for undergraduate equal education opportunity. Of course, the Basic Educational Opportunity Grants are the most visible symbol of that Federal commitment. So there has been a tremendous shift in emphasis in student support, and it was quite remarkable and quite fascinating how quickly it all happened.

As graduate education fell in priorities and interest in Washington, enrollments in the graduate schools—and here I'm limiting myself primarily to the graduate arts and sciences field—generally remained constant or even expanded. Enrollments did not plummet as the Cassandras projected in the early 1970s, although they have dropped significantly in certain disciplines. The physical sciences and engineering fields seem to be much more responsive to either labor market trends or fellowship changes, and these enrollments have dropped remarkably from their peak. However, the other fields by and large continued to expand, albeit at slower rates.

Ph.D. output has been remarkably stable for the last four years at about 33,000 degrees per year. The most remarkable shift that has been going on within those totals—and I haven't thought through the implications of this for graduate student borrowing but I suspect they are significant—has been the remarkable increase in the number of female doctorates and the decline in the number of male doctorates. The number of men receiving Ph.D.'s has been declining but that has been more than made up by the growth in the number of women doctorates.

In 1965, about 11 percent of the doctorates awarded went to women. That percentage has been generally stable since the 1920s, with the exception of the war years, when there was an understandable increase in the percentage of women getting Ph.D.'s. In 1976, of the 33,000 doctorates awarded, 23 percent went to women. That's a remarkable increase in the percentage, and the proportion of doctorates going to

women continues to rise steadily. Someone should think through the implications of this increase for student borrowing.

With that limited background, what is the current Federal role? To this day there is no single agency in Washington that is concerned with graduate education. For many years, especially during the 1960s, I think the university people were very pleased that this was the case. I have heard heated as well as coldly rational discussions of the benefits of not having a single agency that has control of the switch.

The National Science Foundation, National Institutes of Health, Department of Defense and the Energy Research and Development Agency continue to play a role in graduate education. There is no effective inter-agency coordinating mechanism for this process. Even within HEW there is very little linkage between the Education Division and its activities in higher education, and the Public Health Service and its programs. These have been almost two separate worlds. There is no one person, agency, or unit to whom you can address your concerns about graduate education. There is really not a single focal point for today's discussion.

I believe that the Federal role in graduate education will remain poorly articulated. I do not see a sudden coalescing of interests nor focus on this issue. Whereas analysts can write about the Federal role in undergraduate education and to a considerable degree be looking at Office of Education programs, there is no similar agency to address at the graduate level.

The manpower rationale—which like it or not seems to drive the system—I think will remain dominant. The implications of that fact are that we are not going to see much revival of interest in the subject during the 1980s. The hard times for doctorates in the labor market are still ahead of us. I'm not sure that people yet have fully realized the significance of what the 1980s will mean when the enrollment decline that Larry Hough talked about occurs and works its way through the market. Again, I trust Dr. Adkins will address that point.

There is some indication that the focus in Washington, at least among some people, has been to shift away from the concern with the numbers game for Ph.D.'s and to raise questions of quality. Graduate education hardly seems worth doing if you don't do it well. People are raising questions about the adjustments to changing labor markets. They are asking, "Are the best students seeking doctoral training in the arts and sciences or are they shifting more into the professions?" You can't answer that by looking just at numbers. You have to get behind the data and find out what's happening to the best students. There is interest in this issue both in the sciences and in the humanities. It remains a question that no one has addressed with sound empirical data although there may be some studies getting underway.

Equal opportunity concerns of the sort that have driven so much of the action at the undergraduate level do not yet seem to be strong at the graduate level, although at HEW recently we did put together a very

small initiative of $3 million that is a type of graduate education opportunity program clearly aimed at increasing the number of minority students going on into doctoral training. That program will probably remain at a very modest level of funding, however. I have seen no projections to indicate that it will grow to be anything more than a small, although important, program.

The competitive resource allocation process, which has been a source of strength for graduate education, whether we slipped into it by design or by just good luck, remains fairly strong in Washington. That leads me to have a somewhat optimistic view of the next ten years. By this I mean the continued support for the peer review system, for the use of merit fellowships in NSF, and for the general support of high quality efforts wherever located.

In general, I think this process will continue to funnel the bulk of Federal money on other than a strictly geographic or head count basis and keep it concentrated in the graduate universities of greatest strength. I think it would be most unfortunate if that allocation process were reversed; and fortunately, I do not see that happening.

What does all this background discussion have to say about loans at the graduate level? As Larry Hough suggested, one would assume that the role of loans will continue to grow in importance at the graduate level, although the data contain a few surprises.

Office of Education figures showing that loan volume under the Guaranteed Student Loan Program—including both direct federally insured loans (FISL) and state guaranteed loans, but excluding NDSL—has been remarkably stable from 1971 through 1976, slightly over $1 billion a year in volume. But, there has been an interesting shift within the component parts of the program. The direct Federal program (FISL) has been dropping dramatically, both in actual dollars and in the percent of the total dollars. In 1971, of roughly $1 billion in loan volume, $855 million was FISL money. That figure had dropped by 1975 to about $480 million, so it's now less than one-half of the total. As the volume under FISL has been coming down, growth in the 26 states that have separate guarantee agencies has increased to offset the FISL decline. The upshot has been a roughly stable amount of total borrowing.

Within the FISL program, the dollar volume of loans going to graduate students has jumped from about 11 percent in 1971 to just short of 18 percent by 1975. But remember that the total of FISL loans dropped substantially during this period, so there were actually fewer dollars flowing in 1975 to graduate students than there had been in 1971, although as a percentage of the declining total, graduate funds had increased.

Apparently there are no centrally collected data in published form on the composition of lending in the state guarantee agencies. USOE apparently has the data on tape, but they have never processed them. Consequently, I can't tell you what has been going on in the 26 states that

have guarantee agencies, although graduate borrowing under the state agency programs may be considerably higher than under FISL because FISL includes proprietary schools whereas state guarantee agencies do not. Under FISL, the size of the average loan to graduate students has been increasing. In 1971, the average loan was slightly over $1,000; by 1975, it had jumped to nearly $1,500.

There are no published data on the cumulative debt levels or distributions of the cumulative debt among students. Our data base here is woefully inadequate. I cannot tell you (and as far as I know no one can) how much total debt individuals are amassing over their academic careers. If you assume that undergraduates are borrowing more and thus entering graduate school with $4,000 or $5,000 of debt, then as they borrow for graduate school, the total amount of debt may be very large. The cumulative debt limit under GSL is $15,000, but students can also borrow more under NDSL. So we may have some individuals who emerge from graduate school very heavily in debt. Others may be marginally in debt and, unfortunately, we do not have the data to sort that out.

In the NDSL program the graduate component of borrowing, either as a percentage of the dollar amount or the number of loans, has not increased over the period 1971-75. As a percentage of loans, graduate students had 6.4 percent in 1971 and 7 percent in 1975. In dollar amounts, graduate borrowing is about 12 percent, indicating that the average graduate student borrows more per borrowing than the average undergraduate student.

However, the bulk of NSDL funds appears to be still directed at undergraduate students. In general, the sources of data on graduate student borrowing, apart from the Office of Education statistics, are limited to two other sources with which I am familiar. Neither of them provides the kind of detail one would like. The National Research Council's Doctorate Record File, which is the survey of all earned doctorates administered by the graduate school when the student files a dissertation, reports some financing statistics that I have never found particularly useful because they do not list dollar amounts and they do not exclude double counting. A student may have been supported in three or four different ways during a graduate career and each of those could be listed separately. We do not know the relative importance of each. But nonetheless, looking at 1971-76 data on the number of students reporting some borrowing, the number jumped from about 12 percent in 1971 to 23 percent in 1976. Once again this indicated that there has been a substantial increase in the number of students borrowing for graduate education.

Another data source is the National Science Foundation, which conducts an annual survey on graduate science student support. NSF reports only the principal source of support for each graduate student, not dollar amounts. But the NSF data I have seen show a steady increase

in the number of students using loans as their most important financing sources.

What are the prospects? When I consider that other sources of support are likely to shrink rather than grow, I assume that increased borrowing will be virtually inevitable. That is, if students are in graduate school, borrowing will have to be a major source.

Certainly I would look for less university funds going to support graduate students. There will be a decline in the need for teaching assistantships as undergraduate enrollments decline. There will be less free money, that is institutional funds, floating around universities to support graduate students. There will be fewer private foundation grants. The Ford Foundation, for example, supported the Woodrow Wilson Foundation Fellowship program, and then provided $41 million through a program of their own. But since 1974, Ford Foundation support for graduate students has been much diminished, and seems likely to remain so.

Federal fellowship prospects don't seem likely to change either. NSF will probably maintain their 550 fellowships. There will be modest efforts here and there. ERDS will do something in the energy field, and so on. However, no major resurgence of interest seems likely, certainly no return to the support levels of the 1960s.

Research assistantships have actually been fairly stable, at least up through a year or so ago. They will continue to be an important source, but loans continue to stand out as a major source of financing. I am concerned about whether in their current form, student loans can take on the role that logic or data would seem to imply for them, although there have been recent improvements.

The maximum borrowing per year is now up from $2,500 to $5,000. The total debt under GSL has increased from $10,000 to $15,000. These are both improvements that were recommended by various groups in recent years. Some of the more interesting changes though, which I find very relevant at the graduate level, particularly for individuals with substantial cumulative debt burdens, continue to be resisted. I don't see much support for income contingent loans, for consolidation of the various debts a student may have into a single package with a single payment schedule, for variable payments related to income, or for lengthened repayment periods. Without such administrative and procedural changes that are very much needed if loans are to play the role that I suspect they will have to over the next decade, graduate education may be out of reach for many of our citizens.

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Models for Forecasting the Stocks and Flows of Degree Holders and Their Use in Projecting the Demand For and Supply of Student Finance

Douglas L. Adkins

Dr. Adkins examines the two principal classes of theories of manpower forecasting used to predict degree-holder stocks and flows—models of push and models of pull. He critically evaluates their use as predictive tools and explores the policy conclusions that can be inferred from the data developed by these two different methodologies.

David Breneman's story, about how he started his doctoral dissertation on the horrible shortage of Ph.D.'s and ended up worrying about the horrible surplus, reminds me of a book that was published in 1970 called *The Shortage of Scientists and Engineers*.[1] It was written at the end of a long period in which engineers were in short supply, but was published in a year in which the press was filled with doleful stories of jobless young engineers. Allan Cartter, to whom everyone studying the manpower aspects of higher education is indebted, told the author that the book could still be saved if the publisher would just change the title from *The Shortage of Scientists and Engineers* to *The Shortage of Scientists and Engineers* (question mark). Another possible solution would have been to delay publication to the present time, when we once again have a relatively strong market for engineers.

This story points to the perils of forecasting events in the market for educated manpower and leads me into my topic for today.

First, a word on terminology. Stocks of degree holders are the populations who have completed the various degree programs. Flows are the new degree recipients from these programs. Flows of new degree recipients may also be observed at the earlier stage of enrollment in the degree programs.

Being able to forecast these stocks and flows in both the short run and the long run is an essential tool for educational policy making. In the short run, estimates of stocks and flows of degree holders are necessary for many educational purposes, such as determining the demand for student finance and, in the case of loan programs, determining the volume of loan repayments. In the long run, forecasts of the direction and the magnitude of changes in the stocks and flows of degree holders are often

essential for determining a wide variety of educational and scientific policies, particularly those requiring long lead times.

Both short and long-run forecasting require an understanding of the forces that push or pull students through the educational system. Rather than dealing with the nuts and bolts of the forecasting techniques, I think the most interesting approach to my topic will be a look at the two principal classes of models on which the various forecasting methodologies are based: "models of push" and "models of pull."

Models of push see the market for educated labor as dominated by supply-side forces. According to models of push, the flows of new degree holders entering the labor force and of old degree holders exiting due to retirement and death determine the size of degree-holder stocks. The stocks are passively determined by the flows, much as the level of a lake is determined by the inflow and outflow of water. If inflow is greater than outflow, the lake will rise; if inflow is smaller than outflow, the level will drop. To find out what drives the models of push, then, we have to look at the forces that determine enrollments in degree programs.

Most models of push have not articulated very well what the major socio-economic and historical forces causing students to enroll are and how they do it. Such considerations as upward mobility by means of the higher education system, role modeling by individuals as they look around their families and communities, and affluent family incomes are mentioned, but in actual practice, nobody has been able to model these forces sensitively. In most models of push used in forecasting, socio-economic variables have been modeled simply by stable time trends.

The demographic variables, on the other hand, have been sensitively modeled, and so the principal up and down movements in forecasts derived from models of push have come from the movement of demographic variables. God and demography have blessed forecasters of higher education enrollments over those who would predict elementary school enrollment or baby food sales in one important respect. We don't suffer from our inability to forecast fertility. Fortunately for us, the infants have been born 18 or more years before we have to predict whether or not they will enroll in various undergraduate programs. Consequently, the forecasting of the basic population variables is not problematic.

One interesting interaction between socio-economic and demographic variables that affects the parental role in student finance is the phenomenon of "sibling squeeze."[2] When parents have three or four children in undergraduate or graduate institutions, even those with upper-middle class incomes will often be faced with severe financing difficulties. And so, during certain periods when people have larger families and children are spaced relatively closely, the enrollment ratio of their children is lower than that which their affluence would otherwise indicate if their children had been spaced further apart. The one and two-child families of recent years, however, render the parents immune from the sibling squeeze and, thus, allow a given level of parental income per child to result in higher enrollment rates.

Events in the labor market for degree holders are not completely ignored in models of push. But they are seldom modeled very sensitively. Implicitly, models of push assume that the supply of graduates creates its own demand. In conventional economic theory, this could only happen if degree-holder wages were free to fall below those of ordinary workers or if degree holders were perfect substitutes for ordinary workers.

Several theories have also been formulated that depart from conventional economic theory in that they allow unlimited degree-holder absorption at a positive wage differential for degree holders, even when their marginal productivity falls to or below that of ordinary workers. Such a phenomenon could occur because of employer behavior called "credentialism." One variety of credentialsim depends on "education illusion," whereby employers are willing to give salary differentials above marginal productivity differentials to degree holders because they continue to believe in the existence of a productivity margin despite the empirical evidence. A second variety depends on employer taste. Some employers may like to have degree holders around. Having people with degrees around may, in fact, be part of their own compensation. Whatever the reason, if employers are willing to accept any supply of degree holders at a wage differential over that of nondegree holders, we have a model of credentialism. Such models of credentialism and others attempt to explain how supply can create its own demand.[3]

As notable examples of models of push, I might mention one that Gus Haggstrom developed for the Carnegie Commission[4] and one that was used in the early 1970s by the National Center for Educational Statistics.[5]

The second general class of models is one I have called "models of pull." In models of pull the demand side is pre-eminent. Employers are seen as hiring degree holders for their production skills. In these models, stocks of degree holders come into existence to satisfy the needs of the economy for various skills, and there is a stock adjustment process that, with due consideration for lags, keeps the stocks at economically appropriate levels. In models of pull the stock adjustment process is dominant, and degree flows adjust so as to produce a sufficient stock of various types of degree holders to meet economic demand.

Models of pull are the precise opposite of models of push. In models of push, stocks adjust passively to the flows of degree recipients. In models of pull, it is the change in the demand for stocks that pulls students through the higher education system so that the various degree-holder stocks will be brought to levels consistent with the needs of the economy.

There are many variants of models of pull, and the proponents of each argue the differences strenuously. I lump together in the same category what some might consider to be strange bedfellows for a single reason: all models of pull see the stocks of degree holders as ultimately regulated by the needs of the economy rather than coming into existence in passive response to the operation of social forces.

Fixed-coefficient manpower requirement models, in which degree holders of various types are required for production in fixed intensities, constitute a first important variant. Different industries will require given types of degree holders in differing intensities according to models of this type. For example, the electrical machinery industry may require a higher number of B. S. holders in electrical engineering per million dollars of output than will the steel industry. Aggregate demand for degree holders in these models then depends on the level of economic activity and the composition of output.

Manpower requirement models are often used in conjunction with input-output models of the economy. Their users do not deny that substitution between various types of degree holders is possible, but argue that relative intensities of degree holder use in the various industries are likely to remain fairly constant and that the information required for incorporating substitutability into forecasting models is unobtainable.

Models with neoclassical production functions form a second class of pull models. They are a lot more satisfying to economists but also more difficult to use, particularly for longer-run forecasts. Such models see the relative wages of different degree-holder and nondegree-holder stocks, together with the prices of capital and natural resources, as determining the economic demand for the various stocks, because in neoclassical economic theory all human and physical resources are substitutable for all others, although not perfectly so. Given this substitutability, rational decision makers look at the prices of various resources before determining the amount of each they will use in production.

The prices of resources, in turn, are determined in the market, as employers bid for the available resource stocks. In the case of human resources, employers evaluate the worth of degree holders compared to ordinary workers and bid for their services in the labor market. If the salary differential of degree holders over ordinary workers exceeds their marginal productivity differential in a given industry, the employer in neoclassical models of pull reduces his hiring of degree holders and increases his hiring of ordinary workers. This withdrawal of employers from the degree-holder labor market, one might say, fine tunes the relative price of degree holders.

As the economy changes, due to changes in the level and composition of final demand, in the rates of saving and investment in physical capital, and in the rate and character of technological change, employers also change their employment of various kinds of human resources. As this process unbalances the labor markets, changes in relative wages occur to restore balance.

The supply side of both the fixed-coefficient and neoclassical models of pull is almost invariably described by the so-called "human capital model." According to this model, the supply of degree holders is determined by a human capital market mechanism whereby high relative wages (or, more subtly, high lifetime rates of return) cause persons to enroll in degree programs leading to those wages or rates of return. After

information and training lags, new degree holders enter the market in response to high relative wages for their degrees. As sufficient numbers enter the labor market and swell the stock, the relative wages of members of the stock fall. Again with a lag, the fall in the relative wage for the given degree discourages prospective enrollees in the given degree program. Enrollment falls, and the stock is thereby adjusted to an optimum level. Much of the current neoclassical and human capital theorizing takes off from early works by Blank and Stigler[6] and Gary Becker[7] in the early 1960s. Recent notable works are works by Richard Freeman[8] and by Stephen Dresch[9].

Let me compare the models in a summary. Models of push see the system as driven by the supply side as students translate sociological and cultural norms into degree-seeking behavior. The demand side cooperates by not making the practice strongly unprofitable to those who follow it.

Models of pull on the other hand, see the system as driven by the demand side as employers evaluate the productivity of stocks of degree holders and offer relative wages dependent upon their marginal productivity. High relative wages tend, via the human capital mechanism, to draw people into degree programs. Models of pull are dominated on the demand side by variables such as changes in the level and composition of final demand, in the rate of savings and investment and in the rate and character of technological change.

Does empirical evidence enable us to choose between the two classes of models in order to produce preferred forecasting devices? An obvious way to get this kind of empirical evidence on the models would be to look at the real world and see if we can demonstrate that either model describes the situation more accurately. At first blush, we might expect to make the empirical test by merely checking to see if degree-holder stocks respond to the variables used in one model or those used in the other.

I think that this would not be a fruitful direction, even though much empirical work takes this form. The problem is that even if a convincing demonstration could be made that the stocks are sensitive to a given set of variables, it would remain to be shown first that a large fraction of the variation of the stocks could be explained in this way, and second, that the competing theory's variables couldn't do equally well or better.

Besides, when models of either type actually get down to forecasting, nobody completely ignores the demographic and sociological variables on the one hand nor the production or labor market variables on the other. Furthermore, except for the demographic variables, models of push are generally so incompletely specified that the key theoretical variables are usually combined in a smooth time trend of one kind or another.

Proving that enrollments and degree flows are sensitive to relative wage rates or employment opportunities, for instance, would not allow us to choose between models of push or pull, since both types of models

allow for a greater or lesser impact of labor market conditions. Richard Freeman, in particular, has gathered a substantial amount of evidence that degree flows and enrollments are, in fact, sensitive to labor market conditions.[10] We may question whether this sensitivity sufficiently explains the size and rate of change of degree-holder stocks, but there would be substantial agreement that degree flows show sensitivity to the labor market.

Likewise, proving that enrollment and degree flows are sensitive to demographic events would not distinguish between the two types of models, since neither model ignores the role of demography. In models of push, demographic variables are straightforward explanatory variables. Demographic variables also affect models of pull, since in various models, demand-side variables may have their impact through the human resource requirements of *per capita* production or the human capital mechanism may have its impact through changes in the enrollment ratios of given age cohorts. In such models of pull the adjustment path of degree-holder stocks, therefore, depends on age structure.

Since evidence of the sensitivity of enrollments and degrees to either labor market or demographic events will not allow us to choose between models of push and pull for our preferred forecasting methodology, is there any test that will allow us to choose? I would give a tentative "yes" to that question. Models of pull are clearly stock-adjustment models. If the stock of degree holders should be out of equilibrium, given the demands of production and the productivity of degree holders, pull models would assert that stocks will adjust to restore equilibrium. Models of push see no such adjustment process. In models of push, labor market events may affect enrollment and degree flows just like any other socio-economic influence, but they do not have the special stock-adjustment role ascribed to them in models of pull.

I propose an empirical test that looks for evidence of two phenomena: whether the stock of degree holders was out of equilibrium with production requirements at any time in the past; and if so, whether movements in degree conferrals restored the stock to equilibrium after a greater or lesser lag?

Because of the long life of the stock, such movements in degree flows would have to be large to affect the stock materially. Because of the long adjustment lags, they would probably be not only large but cyclic in nature. The empirical test, therefore, becomes a question of whether we find instances of degree-holder stock disequilibrium, and, if so, do we subsequently find large, and possibly cyclic, movements in degree flows working to restore equilibrium.

If we find disequilibrium in degree-holder stocks and large equilibrating movements in degree flows, it would constitute powerful evidence in favor of models of pull. If we do not find such disequilibrium and adjustment, it would be evidence against models of pull and in favor of models of push.

Let's look first at the evidence from the 1930s. During the great

depression of the 1930s there was a sharp, across-the-board decline in the demand for labor in all economic sectors except government, where employment stayed roughly constant. The stock of degree holders can easily be said to be out of equilibrium at that time, since the level of output had shrunk so far below its previous level.

Certainly physical capital was out of equilibrium at this time. As an indicator of how responsive investment in physical capital was to the disequilibrium of the Great Depression, data on the rates of change in gross private domestic investment are presented in Table 1, Column 1.[11] In this series from 1930-1940, rates of change on the order of plus or minus 50 percent were common, as changes in physical investment were used to adjust the stock of physical capital that was first out of equilibrium on the high side in the early Thirties after the crash and then on the low side as recovery got under way in the middle Thirties.

Table 1: Annual rates of change in gross investment in physical capital and in degree output, 1930-1940 (in percentages)

Fiscal year	*Gross private domestic investment (in billions of 1954 dollars)*	*Degree output*					
		*Bachelor's**		*Second level**		*Doctorate*	
		Male	*Female*	*Male*	*Female*	*Male*	*Female*
1930-31	-36.0	+7.4	+5.8	+7.8	+10.9	+12.9	+14.4
1931-32	-74.0	+7.3	+5.8	+8.4	+11.0	+ 0.3	+11.8
1932-33	+ 2.6	+0.2	-0.9	-3.3	- 2.6	+ 4.6	- 9.9
1933-34	+85.0	+0.2	-0.9	-3.4	- 2.7	+ 6.3	- 6.7
1934-35	+117.6	+3.0	+3.0	-0.6	+ 0.4	- 5.3	+ 3.7
1935-36	+30.4	+3.1	+3.0	-1.0	+ 0.3	+ 1.8	+ 3.1
1936-37	+28.6	+7.6	+8.6	+4.4	+ 9.8	+ 0.6	- 3.2
1937-38	-42.6	+7.5	+8.6	+4.7	+ 9.9	+ 5.0	+11.1
1938-39	+39.4	+7.3	+7.1	+4.4	+ 9.7	+ 5.4	- 2.1
1939-40	+34.3	+7.1	+7.1	+4.8	+ 9.9	+ 8.5	+ 1.9

*Since the bachelor's and second-level degree data were collected in even years only, the single-year rates for these degrees are based on interpolations. For doctorates the National Research Council data that are used are annual.

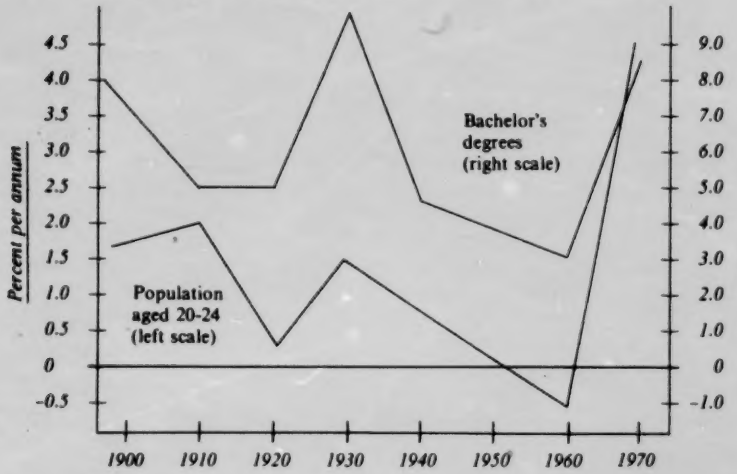
Note: Professional degrees beyond the bachelor's are included in the second-level category.

Sources of basic data: U. S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, Government Printing Office, Washington, D. C., 1960, Series F-92, p. 143; U. S. Office of Education, *Biennial Survey of Education in the United States*, Government Printing Office, Washington, D. C., relevant volumes; and L. R. Harmon and H. Soldz, *Doctoral Production in the United States 1920-1962*, National Academy of Sciences, National Research Council, Washington, D. C., 1963.

The unemployment of college graduates during the depression is evidence that the stock of degree holders was in surplus at the same time. The evidence could be better: we don't have a statistical series; but we do have the journalistic evidence of the times that there was vast unemployment among college graduates, graduate degree holders, and Ph.D.'s. It

seems rather unassailable that the human capital economy was in disequilibrium as well as the physical capital economy.

Figure 1: Annual growth rates of bachelor's degrees and the population aged 20-24 calculated over the 10 years prior to the year indicated*



*Except for 1960, the rate of growth of bachelor's degrees for the period preceding 1960 was calculated over the preceding 20 years to avoid the distortion that would result from using the veterans-bulge-determined 1950 figure.

Sources of basic data: U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, Government Printing Office, Washington, D. C., 1960 and "Demographic Projections for the United States," Series P-25, No. 476, Government Printing Office, Washington, D. C., February, 1972; and Douglas L. Adkins, *The Great American Degree Machine: An Economic Analysis of the Human Resource Output of Higher Education*, Carnegie Commission on Higher Education, Berkeley, California, 1975, Appendix A.

Given a disequilibrium in the stock of degree holders in the 1930s, can we find the same kind of equilibrating movements in the investment in the human capital of academic degrees that we demonstrated had occurred in the investment in physical capital?

First, a slight digression: there are some cycles in degree output that originate on the supply side in the demography and we should not confuse them with those that we are looking for on the demand side that originated in the economy. In Figure 1, we have a demonstration that fluctuation in degree output and in the college-age population are related. The two series, however, grew at remarkably different rates.

Let us now look for large movements in degree output that would correspond to the movements in the demand for degree holders that we have identified. If education does produce human capital—and I am

sure we all believe it does—then it is analogous to the new physical investment that adds to the stock of physical capital. If human capital was also out of equilibrium, new human investment (i.e., degree conferrals) should follow the same pattern of decline and then recovery as physical capital investment did.

In fact, we can discern such a pattern in all degree series. In the 1932-36 period, all series either experienced a pause in growth or an actual decline. (Table 1, Columns 2-7). But the magnitudes of both the decline and the recovery are small compared with the large declines that would be necessary to make the stocks decrease very rapidly. In fact, the stocks of degree holders in all series did not decline in the Depression; they expanded rapidly throughout the 1930s. (See Table 2).

Table 2: Estimates of annual growth rates of degree conferrals and degree-holder stocks, 1930-1940 (in percentages).

	Degree Conferrals	Degree-Holder Stocks
Bachelor's	4.9	7.1
Second Level	3.2	3.6
Doctorate	3.6	7.6

Source: Tables 3,4,5 and 6.

Bachelor's degree stocks increased by a compound average of 7.1 percent a year during the decade 1930 to 1940. Second level degree stocks, which had traditionally been growing more slowly because the major professional degrees constituted a large proportion at this time, increased at 3.6 percent per annum during the period. And doctorates increased at over 7.6 percent during the period.

To again pose the question at hand: in response to the collapse of production, did enrollments decline substantially in a relatively short period of time, and when recovery came, did they also increase substantially? The answer is decidedly no. You see only small changes in the levels of degree output, changes that made no dent in the disequilibrium of degree-holder stocks, all of which grew rapidly over the decade.

The same was true of individual academic specialties. Tables 3, 4, 5 and 6 give information on degree conferrals and degree-holder stocks in specific disciplines. (Reference to the 1930-1940 column).

From this evidence, I conclude that models of pull are empirically irrelevant in explaining the events in the American human capital economy of the 1930s. Models of push, however, are consistent with it.

In the absence since World War II of a large cycle in economic activity, such as that of the 1930s, we must look for other evidence of disequilibrium in the stock of degree holders. An appropriate test for the

Table 3: Estimates of annual growth rates of bachelor's degree conferrals in the United States calculated over 10-year periods, 1900-1970. Aggregation levels 1 through 3.

	1900-1910	*1910-1920*	*1920-1930*	*1930-1940*	*1940-1950*	*1950-1960*	*1960-1970*
Aggregation level 1							
Total all fields	5.1	5.1	10.0	4.9	9.1	-1.0	8.2
Aggregation level 2							
1. Sciences	4.6	4.1	8.2	4.2	9.5	-0.9	10.4
2. Technologies	6.1	6.9	12.0	5.8	9.8	-1.1	6.3
3. Arts	4.4	4.0	8.2	3.5	5.7	-1.0	10.2
Aggregation level 3							
1. Mathematical and physical sciences	4.5	2.2	6.4	3.1	6.9	0.5	6.0
2. Engineering	7.0	8.9	6.1	3.6	13.2	-3.2	3.2
3. Biological and agricultural sciences	2.4	6.9	5.7	4.4	10.3	-3.8	8.2
4. Health sciences	7.7	-8.7	10.0	-2.7	20.4	-0.5	5.9
5. Social sciences and technologies	5.6	4.6	10.3	4.1	10.1	-1.8	12.1
6. Business and other administration	10.8	21.4	14.2	7.5	14.6	-3.3	7.5
7. Psychology	7.0	7.7	13.5	7.5	12.9	-1.2	14.7
8. Education	6.8	27.0	23.3	7.9	4.3	3.7	6.3
9. Arts and humanities	4.4	4.0	8.2	3.5	5.7	-1.0	10.2
10. Other	4.6	6.2	8.6	2.9	1.9	-5.4	8.4

Table 4: Estimates of annual growth rates of second-level degree conferrals over 10-year periods, 1900-1970. Aggregation levels 1 through 3.

	1900-1910	*1910-1920*	*1920-1930*	*1930-1940*	*1940-1950*	*1950-1960*	*1960-1970*
Aggregation level 1							
Total all fields	0.5	-1.8	10.1	3.2	7.2	1.8	8.8
Aggregation level 2							
1. Sciences	1.8	6.0	7.6	4.4	11.2	0.9	10.6
2. Technologies	0.4	-2.3	10.7	3.1	6.4	1.9	8.4
3. Arts	0.6	-4.0	8.2	3.2	8.0	2.3	9.4
Aggregation level 3							
1. Mathematical and physical sciences	2.1	5.0	6.4	3.3	8.8	2.0	8.5
2. Engineering	3.5	13.1	6.1	4.4	15.5	4.6	8.6
3. Biological and agricultural sciences	0	10.3	5.3	5.0	10.0	-0.9	7.8
4. Health sciences	-0.9	-5.1	6.4	0.8	3.7	0.9	3.2
5. Social sciences and technologies	2.7	-1.8	10.7	-0.7	8.4	-2.1	8.7
6. Business and other administration	4.8	15.8	19.6	7.8	9.9	0.6	10.2
7. Psychology	1.7	4.4	12.8	7.6	12.9	1.0	12.9
8. Education	2.4	19.6	23.4	8.7	3.6	6.3	9.5
9. Arts and humanities	0.6	-4.0	8.2	3.2	8.0	2.3	9.4
10. Other	5.6	9.7	14.2	6.4	9.4	3.9	14.2

Table 5: Estimates of annual growth rates of doctorate degrees over 10-year periods, 1900-1970. Aggregation levels 1 through 3.

	1900-1910	*1910-1920*	*1920-1930*	*1930-1940*	*1940-1950*	*1950-1960*	*1960-1970*
Aggregation level 1							
Total all fields	1.5	3.3	14.1	3.6	7.3	4.0	11.8
Aggregation level 2							
1. Sciences	1.3	3.2	13.5	3.7	5.9	3.9	10.6
2. Technologies	2.0	3.6	17.3	3.9	11.3	3.9	14.0
3. Arts	1.6	3.6	12.9	3.0	5.3	4.8	10.3
Aggregation level 3							
1. Mathematical and physical sciences	1.0	2.8	13.2	3.4	7.3	2.3	10.0
2. Engineering	5.2	8.2	20.5	4.1	15.0	6.6	16.5
3. Biological and agricultural sciences	2.6	4.5	13.9	6.1	4.5	4.4	9.7
4. Health sciences	0	-0.6	10.8	-3.3	15.3	-0.1	11.5
5. Social sciences	0.6	2.5	13.0	2.2	6.4	4.0	11.6
6. Business and other administration	5.2	5.7	20.1	2.3	6.7	1.6	14.7
7. Psychology	1.3	3.1	12.8	1.3	12.2	5.6	10.7
8. Education	7.2	6.2	21.3	6.6	9.8	5.3	14.1
9. Arts and humanities	1.6	3.6	12.9	3.0	5.3	4.8	10.3
10. Other	0	0	14.9	-6.7	23.9	8.4	11.5

Table 6: Growth rates of the stocks of persons in the U.S. holding academic degrees from U.S. universities, classified by their highest degree: ten-year compound rates, 1930-1970 (in percentages)

	Bachelor's			
	1930 -1940	*1940 -1950*	*1950 -1960*	*1960 -1970*
1. Mathematics and statistics	4.3	3.5	3.5	7.3
2. Computer and information science	–	–	–	73.9
3. Library science	5.1	3.6	2.7	1.4
4. Philosophy (not incl. scholastic philosophy)	5.6	4.3	5.3	7.5
5. Chemistry	5.0	4.9	3.0	3.4
6. Earth sciences	3.6	3.0	3.8	1.2
7. Physics	5.4	5.4	5.1	4.3
8. Physical science n.e.c.	3.1	4.1	4.2	2.0
9. Architecture	4.9	4.4	5.1	4.2
10. Chemical-materials engineering	5.1	4.3	3.0	1.7
11. Civil and other heavy engineering	5.6	5.5	4.4	2.1
12. Electrical-electronic engineering	5.7	6.4	4.5	3.2
13. Geological-mining engineering	5.4	4.5	4.0	0.0
14. Mechanical-equipment engineering	5.7	6.2	4.1	2.4
15. Engineering and other technical specialties n.e.c.	6.6	7.8	5.6	5.2
16. Biological sciences	6.4	6.5	4.1	6.3
17. Agriculture	4.6	4.1	3.4	2.2
18. Dentistry	–	–	–	–
19. Medicine	–	–	–	–
20. Nursing, therapy, and dental hygiene	1.3	4.7	7.2	5.5
21. Physical education	12.5	5.3	4.8	4.6
22. Health professions n.e.c.	1.4	4.7	6.3	4.3
23. Anthropology and archeology	10.8	13.2	8.8	16.2
24. Economics and agricultural economics	8.1	5.8	3.8	4.2
25. History	5.6	4.4	3.8	6.4
26. Political science	10.0	10.7	7.2	10.0
27. Sociology and social psychology	9.1	8.1	5.3	7.4
28. Social science n.e.c.	12.0	12.8	10.9	8.3
29. Journalism and communications	5.9	4.1	2.3	2.3
30. Business administration	11.4	9.2	6.5	5.3
31. Administration specialties other than business administration	6.2	11.0	7.1	3.6
32. Law	–	–	–	–
33. Social work	5.8	6.5	0.7	7.5
34. Social science professions n.e.c.	11.9	13.2	12.6	6.4
35. Psychology	9.7	9.1	5.4	8.7
36. Education, primary, preprimary, exceptional	14.1	6.9	6.9	6.6
37. Education, secondary, adult and specialized	13.2	6.3	5.5	4.5
38. Education n.e.c.	11.6	4.9	7.1	8.4
39. Home economics	5.6	4.2	2.1	1.4
40. English literature, dramatic arts, and speech	5.6	4.5	3.4	5.4
41. Art and music	5.8	4.8	3.0	3.1
42. Western European languages and literatures	4.8	3.3	1.8	5.7
43. Non-Western European languages and literatures	7.2	7.2	7.3	11.1
44. Religion and scholastic philosophy	6.6	5.5	6.6	2.9
ALL FIELDS	7.1	5.9	4.9	5.1

Second level			
1930 -1940	1940 -1950	1950 -1960	1960 -1970
4.3	3.8	5.0	11.2
-	-	-	81.1
13.1	9.0	8.7	11.1
4.9	4.3	7.4	11.2
3.2	3.7	3.5	3.8
4.0	3.9	6.5	4.8
4.5	5.6	5.4	7.6
3.5	3.2	5.9	6.8
5.2	5.6	8.5	8.4
5.6	5.7	5.0	4.6
6.1	8.7	9.8	8.7
6.2	6.4	8.8	9.4
5.9	6.0	7.6	5.2
6.1	8.5	9.0	8.6
6.7	10.8	11.7	10.8
3.9	6.3	6.4	7.4
4.5	4.4	5.3	3.5
0.5	0.3	1.5	1.5
0.8	1.0	1.7	1.7
2.7	6.0	10.0	8.3
14.5	6.0	5.8	5.8
1.1	5.2	5.2	4.0
12.1	8.7	8.3	12.2
7.4	8.0	6.8	7.3
4.7	5.1	4.5	7.4
7.3	12.4	7.3	8.9
8.4	9.0	7.1	7.7
10.8	10.5	13.2	12.2
5.7	4.8	5.7	6.4
12.0	10.8	9.7	8.9
11.8	6.0	6.7	5.0
2.9	1.1	2.2	2.2
12.4	7.7	6.3	6.8
13.2	14.4	23.6	18.7
8.9	9.7	7.1	8.4
15.0	6.6	7.9	7.6
15.4	6.8	8.4	6.9
12.1	6.1	7.8	6.7
5.8	5.6	5.0	4.5
5.0	5.1	5.4	8.0
5.6	6.1	6.5	5.7
4.2	4.0	3.8	8.4
4.5	7.4	11.4	16.5
0.4	1.9	3.7	4.6
3.6	3.3	4.9	5.6

Doctorate			
1930 -1940	1940 -1950	1950 -1960	1960 -1970
7.9	4.5	7.0	9.9
-	-	-	74.4
-	10.8	15.2	9.8
5.6	7.7	10.3	10.0
7.2	4.9	5.4	4.8
5.8	2.8	6.5	7.2
6.8	4.5	8.3	8.1
7.2	5.7	7.0	6.6
-	-	26.8	8.1
11.0	7.6	9.5	8.9
14.2	11.3	15.1	16.7
14.1	10.9	16.3	15.1
-	12.3	16.9	18.6
11.4	7.4	11.0	13.3
13.8	9.9	13.5	16.2
8.6	4.0	5.7	6.6
9.1	8.8	10.6	6.4
-	-	28.2	8.2
3.2	2.3	13.0	8.3
14.9	12.9	18.9	13.0
10.3	5.7	7.4	5.9
2.8	4.0	7.0	4.8
14.8	5.7	6.7	8.2
5.9	3.6	5.7	6.8
7.4	3.9	5.2	5.9
6.6	4.1	6.5	6.8
7.7	5.5	8.0	7.0
5.3	5.7	13.5	10.4
8.6	4.1	12.7	10.9
14.1	6.8	11.7	12.3
9.1	4.8	5.7	7.6
3.0	-0.1	1.6	0.7
4.3	2.6	11.0	12.8
4.5	1.3	6.3	21.7
6.2	4.6	10.6	7.9
14.2	9.0	18.0	14.9
12.2	8.3	12.4	10.3
12.0	8.2	9.6	8.5
6.6	6.4	10.3	7.8
7.9	4.4	7.1	7.5
7.8	4.1	7.6	8.5
9.5	3.1	3.1	4.9
12.8	6.2	10.0	9.6
5.1	4.8	5.7	4.2
7.6	4.8	7.2	7.6

post-war period would be whether the educational attainment of occupations exceeded certain standards for detailed occupational categories. If one thinks in terms of the manpower requirements rather than the more sensitive neoclassical model of production, it can be seen that certain occupations require a higher level of education than others. It takes more education to do somebody's tax return than to carry bricks, for example.

Nobody really knows what levels of educational attainment are required for the various occupations. All we can do, therefore, is to take a given date as a benchmark. Suppose that we take 1940 or 1950 or 1960 as a benchmark. If we should take 1960 as the benchmark and if educational attainment in 1960 was higher than in 1940 and 1950, we could conclude that the 1940 and 1950 degree-holder stocks were not in equilibrium, unless technical advances had increased the required level of educational attainment for each industrial sector. Conversely, if we use 1940 standards as benchmarks, we could make a conclusion as to whether the stocks of later years were or were not in equilibrium.

Figure 2 presents data that are relevant to whether or not the degree-holder stocks in 1969 were in equilibrium or not. If we use the 1940 standards as benchmarks, in 1969 only 45 percent of college male graduates were required for detailed occupational categories. If we use 1950 standards, only 50 percent of college graduates were required in 1969. Finally, if we use 1960 standards, only 70 percent of college graduates would be required in 1969.

From these figures, we might conclude that in 1969 we had a serious situation of disequilibrium in the degree-holder stock, one which could be characterized as a vast surplus, if we use the earlier benchmarks. With appropriate attention to training lags, the demography, and other variables, we would then expect to find large declines in degree output in the 1960s, leading ultimately to stock declines. Instead, as we all know, degree output expanded rapidly during the 1960s. We may look at Tables 3, 4, and 5 to determine the growth rates of bachelor's, second-level, and doctorate degree conferrals during the 1960s. The first line of each table gives the growth rates over the decades from 1900 onward. Looking at the 1960s, the far right column in all tables, we notice that degrees increased by compound average rates of 8.2 percent for bachelors, 8.8 percent for second-level, and 11.8 percent for doctorates.

We may also look at the last line of Table 6 to see what happened to the stocks of degree holders in the 1960s. They all increased at very rapid rates. Stocks of bachelor's degree holders increased at an average annual rate of 5.1 percent, despite the demography. So did stocks of second-level and doctorate degree holders. The latter two stocks increased at 5.6 and 7.6 percent per annum respectively during the 1960s.

Needless to say, the combination of rapidly expanding degree-holder stocks with rapidly growing degree output is inconsistent with the idea that a model of pull is reacting to a surplus situation. We can conclude that either the stocks of degree holders were too small relative to the de-

mand for them during the 1960s, or that models of pull cannot explain the formation of degree-holder stocks any better during the 1960s than they did during the 1930s.

I have presented evidence that if we assume that degree-holder stocks in various academic specialties were in rough equilibrium in 1940, 1950, or 1960, they certainly were not in 1969 (Figure 2). The assumption that degree-holder stocks were in equilibrium even in 1960 would probably be vigorously challenged by at least one modeler of pull. In a model that Stephen Dresch recently published in the Journal of Political Economy[12] he sees the equilibrium proportion of degree holders in the adult population as not being attained until it reaches 18 percent in 1980.

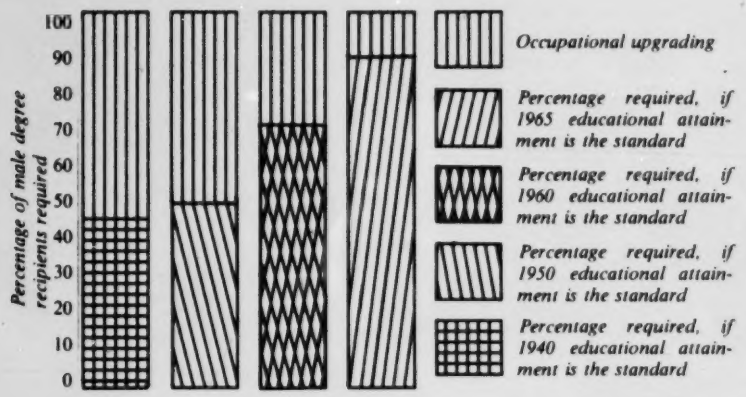
At that time in his model, however, due to various training and information lags and various events in the demography, new entrants into the labor force will be 33 percent degree holders, using age 24 as our indicator. According to Dresch's model, as the group of new entrants comes in with 33 percent degree holders, the population will progressively move out of equilibrium.

This disequilibrium produces very interesting equilibrating movements in the model. Between 1985 and 2000 the educated share of new entrants in the labor force drops precipitously, by more than 50 percent. In other words, it goes from 33 percent degree holders in the new entrants to about 15 percent. That is a fantastic drop. No such precipitous decline in degree output has been registered in the past except in wartime; in fact, there have been very few degree output declines to mention over any decade of this century. (See Tables 3, 4, and 5). Bachelor's degrees declined in 1950 to 1960, but that can easily be explained by the demography plus the end of the postwar veterans' bulge. Second-level degrees declined from 1910 to 1920, but that decline can also be explained by demographic factors. With these exceptions, degree output expanded continuously throughout this century.

Degree output declines of the magnitude predicted in Dresch's model are what I might expect in a stock-adjustment model of higher education when it is in disequilibrium (although the lags seem overly long). However, if we do not observe such degree declines in nature, so to speak, is this kind of model empirically relevant? (Even if it is not empirically relevant, I think it is a technically beautiful piece of work and, in fairness to Dresch, there were sufficient caveats in his paper that noted it was a beginning attempt to do this kind of modeling and that he wouldn't stick with any particular set of numbers.)

The point to take from this discussion of his paper is that in models of pull relatively small disequilibria in degree holder stocks will almost inevitably result in large increases and decreases in degree output. Virtually all dynamic stock-adjustment models generate cycles of some sort. What makes Dresch's model so interesting to our discussion is that he did not shrink from the conclusion that models of pull are likely to predict a very large drop in enrollment if they are used for long-run forecasts and if they incorporate real-world demographic events.

Figure 2: Percentage of male degree recipients in the period 1965-1969 required to maintain the occupational standards of educational attainment which prevailed in selected earlier years.



NOTE: The calculations use the occupational growth requirements estimates in John K. Folger, Helen S. Astin and Alan E. Bayer, *Human Resources and Higher Education*, Russell Sage Foundation, New York, 1970, Table 2-3 for 1950, 1960 and 1965, and use the data in Richard S. Eckaus, "Economic Criteria for Education and Training," *Review of Economics and Statistics*, May 1964, p. 185-6, to calculate the same for 1940. Using the start of the period as the base, the percentages of occupational upgrading are as follows: 1965-1969—9%, 1960-1964—18%, 1950-1959—32%, and 1940-1950—11%. For these figures, the occupational standard is that of the beginning of the period; recalculations which use the standards of previous periods are presented in this chart. These calculations are quite approximate since they do not use the 1969 occupational structure to recalculate the earlier data.

I would say that the wreckage of the doctoral labor market forecast by almost everyone for this coming decade should provide a good test for theories of push or pull. The education industry is generally considered, perhaps for political and economic reasons, a fixed-coefficient industry. Student-teacher ratios remain remarkably constant over time. People talk about variations in student-teacher ratios, but the very fact that we expect relatively small variations rather than large changes reflects its basic stability.

Now, if we can use the fixed-coefficient model as an approximation of the technology of higher education, demand for the stock of college instructors will drop in proportion to the demographically-induced drop in college enrollment that is due to begin shortly on a national basis. The 18-21 age cohort is projected to drop from 17 million to 15 million over the period 1980 to 1986. Demand for new college faculty, not con-

sidering deaths and retirements, would then be negative, according to the fixed-coefficient model.

Considering deaths and retirements, the demand for new faculty will still be very small or, perhaps, still negative. Projections of the demand for new Ph.D.'s in university employ range from minus 5,000 to plus 10,000 a year. Meanwhile, Ph.D. output, as David Breneman pointed out, has been in the 30,000s and may increase somewhat due to a demographic expansion of the appropriate age cohorts. So Ph.D. output is likely to be between 30,000 and 40,000 a year.

I think everyone would agree that the stock of Ph.D.'s will be seriously out of equilibrium with the demand, at least in academic teaching. Even now, there are substantial absorption problems for many Ph.D. disciplines. In the 1980s we would, then, expect Ph.D. output to decline very sharply. If we were mesmerized by the logic of models of pull, we might expect Ph.D. output to decline practically to zero since there will be roughly zero demand for new faculty members and a large accumulating surplus of would-be faculty members. My own guess is that we will see a moderation and perhaps a cessation of growth of Ph.D. conferrals, but not a decline of any magnitude. The future will tell, however, and will constitute a test of models of pull versus those of push.

As for implications for policy, if models of push are more nearly right in predicting that enrollment will remain high for much of the rest of the century, except for the expected dip due to demography in the 1980s, the appropriate policies could continue about as at present. We will need subsidized student finance for social equity purposes. I'm not referring to student loans whose full cost is borne by the student, but the subsidy element in either student grants or in student loans. We will also need some institutional assistance to promote desired levels of science and culture and to counteract the demographically induced vagaries of prospective university finance, particularly for private institutions.

Manpower concerns could become an important new policy area. Graduate students attempting to get faculty jobs will constitute a new disadvantaged group, suddenly beset by market forces and in need of employment assistance. Federal or state governments may want to assist them. One approach might be to require educational institutions to publish truth-in-education analyses of the employment experience of people with their degrees. Government could also encourage various types of financing flexibility, such as loan forgiveness in certain circumstances. Likewise, government might encourage greater curriculum flexibility so that Ph.D.'s, A.B.D.'s and other graduate students could more easily fit into the general labor market.

Federal policy might also include attempts to minimize the damage to science and culture as a generation of scholars is put under stress. Along this line, it might be desirable to designate a limited number of departments in major disciplines as national departments and provide them with special funding for basic research.

These ideas, which I do not necessarily favor, are given as examples of policies that would be appropriate to a future envisaged by models of push. They bring no surprises.

If models of pull were more nearly correct, however, and if Stephen Dresch's simulation, for instance, is an idea of what the future holds, then much more stringent government policies might be appropriate.

In Dresch's scenario, enrollment collapses, falling to half its earlier level in a few years. The surplus of degree holders at all levels grows mightily, followed by falling wages, vanishing job opportunities and riots in the streets. The latter would occur because a generation felt suddenly deprived of what is considered its birthright: the opportunity to get a good job by behaving well in school. One can imagine the firing of large portions of the tenured faculty after a great fight about academic feather-bedding. Many private and even public institutions would be in the bankruptcy courts.

Under such circumstances, certain new policy options might be proposed. Institutions might attempt to pump up student demand for places by using vastly increased grants and heavily subsidized loans should they be provided, in order to lower the costs to students. All of a sudden, life-long learning might be an idea whose time had come. We might see policies to assist private schools facing bankruptcy. Perhaps hefty adjustment assistance would be provided, as in textiles and shoes. Finally, in a nonexhaustive survey of policy possibilities, we might see a kind of neo-Ludditism, whereby efforts would be made by government regulations to prevent the new interactive electronic technologies from displacing faculty.

To conclude, from a policy point of view, it makes a great deal of difference whether we use forecasts based on theories of push or theories of pull.

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FOOTNOTES

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11. All tables and figures are adapted from Douglas L. Adkins, *The Great American Degree Machine: An Economic Analysis of the Human Resource Output of Higher Education,* Carnegie Commission on Higher Education, Berkeley, California. Used with permission. Copyright © 1975 by The Carnegie Foundation for the Advancement of Teaching.
12. Dresch.

Medical Education's Response

Bernard Nelson

Dr. Nelson's professional experience and recent efforts as Chairman of the American Association of Medical College's committee on the financing of medical education provide a firsthand perspective on the key provisions of the Health Professions Education Assistance Act of 1976. His observations on the process that gave birth to the 1976 Act form a useful case study on the dangers of too much haste and too little coordination among the key interest groups affected by the law. This paper discusses the Health Professions Guaranteed Loan Program as it might have been were there greater coordination. The revisions he suggests are not new, but in their consolidated form they represent a loan proposal that would be strengthened by the fact that it recognizes the requirements and interests of borrowers, lenders, the Federal government and the health professions schools.

I would like to review the recent changes in the Federal health manpower legislation that have a particular effect on financial assistance for medical students, the preliminary findings of the task force established by the Association of American Medical Colleges, and a suggested new approach to loan financing for medical students.

In response to expressions of concern over the availability of financial aid for medical students by many of its member schools, the Association of American Medical Colleges established a task force in the spring of 1976. At the time the task force was established there was considerable uncertainty regarding the provisions for student assistance and capitation support that would be contained in Federal legislation replacing the Comprehensive Health Manpower Act of 1971. The Health Professions Educational Assistance Act of 1976 (Public Law 94-484) was finally passed in the fall of 1976, following two years of intensive debate over the role that the Federal government should play in providing financial assistance to medical schools and medical students in particular.

The new legislation represents a major change of emphasis on the way in which Federal dollars should be expended for health manpower training. In prior years, the government's major role was to stimulate an increase in the supply of physicians by encouraging the growth of class size in medical schools. This growth was achieved largely through the use of capitation payments to schools that increased class size by a fixed amount. This process was very successful. The total number of enrolled

medical students increased from 37,669 in 1969-70 to over 56,000 students in 1975-76.

The rationale then for the development of the Comprehensive Health Manpower Act of 1971 was the widespread impression that the nation faced a serious shortage of physicians—a deficit of as many as 50,000. This figure, initially reported by HEW, was also used in the influential 1970 Carnegie Commission Report. Therefore, the Comprehensive Health Manpower Act of 1971 continued the health professions direct loan and grant programs for medical students that had been initiated in the mid-1960s.

By 1975, interest in increasing the aggregate supply of physicians through increasing enrollments had begun to subside. Public debate became focused on the problem of distributing practicing physicians, both geographically and by the type of practice. It was generally conceded that the areas of the country experiencing the greatest shortage were the rural and inner city areas. Furthermore, it was also generally acknowledged that more physicians were needed to provide first contact or primary care in contrast to specialty care. Just how the Federal government should develop legislation that would insure a better geographical and specialty distribution of physicians became the focus of congressional debate.

After a long and bitter contest in the House and Senate, P.L. 94-484 was largely written by the congressional staffs in conference in an effort to balance opposing interests. A major change was the increased emphasis on service related scholarships as a means of improving the geographical dist tion of physicians. These scholarships are awarded to students who accepted into the National Health Service Corps. For each year of scholarship support consisting of a monthly stipend plus tuition benefits, the student must spend one year practicing in an area designated by the Health Services Corps.

Service related scholarships for medical students are not new. What was new in this legislation was the intent to significantly increase the number of students to be supported by the National Health Service Corps. The goal was to enroll into the Corps from 25 to 50 percent of the medical schools' classes. Also, the legislation made new provisions regarding the students' abilities to buy out of their service obligations in return for the financial support they received from the government. The penalty clause for dropout was fixed at three times the amount of the scholarship plus the accumulated interest; all payable in one year.

Since most of the scholarships were valued in excess of $10,000 per year, the effective penalty for a student who had received four years of support was a debt in excess of $120,000. The purpose of the penalty was to insure few defaults from the obligation incurred by the student.

It's questionable, however, whether such a stringent penalty is necessary, since there is widespread and genuine student interest in participating in the National Health Service Corps. Student interest has also shifted dramatically away from the specialties in favor of primary

care practices. Newly developed residency training in family practice has attracted large numbers of graduates, many of whom will practice in areas typically short of physician services. I would add that Dr. Adkins's comments regarding student awareness of market conditions holds for medical students. They are aware of the changing need for physicians within society and they have made their plans accordingly.

As I noted before, previous legislation had been designed to encourage class size through institutional incentives, largely capitation payments. Student aid was made available to ensure that students were not denied access to medical education because of a shortage of personal financial means. Present legislation links up student aid with societal needs. Specifically, it attempts to alter the present trends in geographic and specialty distribution of physicians.

P.L. 94-484 does continue the Health Professions Loan Program but at a reduced level and at higher interest rates. It does enable the schools to continue to lend funds to students from the pool of repayment dollars received from this program. However, it should be noted that the medical schools that have been established in recent years have not had time to develop a capital base for health professions loan programs. For them the phasing down of the program means that the health professions loan will never be a major source of financial support for students enrolling in their schools. P.L. 94-484 repealed the Health Professions Scholarship Program and established a new program of scholarship support for students of exceptional financial need. Students may be supported in this latter program for one postbaccalaureate year.

It also establishes a new federally guaranteed loan program for health professions students, often referred to as "super FISL." The decision to increase the interest rate on student loans to more closely reflect market conditions and to restrict the general availability of loan and grant funds grew out of a concern that insufficient numbers of students would voluntarily apply for admission to the National Health Services Corps if attractive financial aid programs continued to be available as an alternative means of financing medical education.

The legislation also has a curious penalty clause that fines the student $1,500 for withdrawal of an application to the Corps after acceptance, but prior to receiving scholarship support. There is some hope that this punitive clause can be eliminated from the legislation since it is clearly unnecessary. The penalty of $1,500, coupled with the buy-out penalty referred to earlier, establishes an approach to medical student financing that can scarcely be expected to generate good will between medical students and the Federal government.

Under the new loan program, students may borrow from private sources up to $10,000 each year with an aggregate borrowing limit of $50,000. The repayment is guaranteed by the Federal government. In sharp contrast to existing guaranteed student loan programs, the interest due on the loan each year, including those years during which the student is enrolled in medical school, is to be paid by the student. The in-

terest rate, which is not to exceed ten percent per year plus two percent for loan insurance, is fixed annually by the Secretary of the Department of Health, Education, and Welfare and is not subsidized by the Federal government. The student borrower under this legislation is prohibited from discharging his or her obligation to repay the loan by declaring bankruptcy within five years of the date repayment is scheduled to start. The constitutionality of this provision has been questioned. Access to the loan program is limited to one-half of the student body at each medical school. This provision also appears to have been motivated by the concern that students would fail to enroll in the National Health Service Corps if alternative means of student financing were generally available. Finally, specific provisions in the legislation have been made to encourage Sallie Mae participation in the program.

Since the passage of P.L. 94-484 in the fall of 1976, there has been as much controversy over the development of regulations governing the implementation of the Act as there was over the initial development of legislation. Many of the important regulations remain unpublished and there is some doubt whether all of the necessary regulations will have been developed in time to assist students enrolling this fall. All of these uncertainties create major problems in attempting to determine how much aid medical students will need.

Clearly, the Federal government plays a dominant role in loan and scholarship support for medical students. For the 1975-76 academic year, it was estimated that medical students received in excess of $148 million in grant and loan support. Of this amount, over $67 million, or approximately 45 percent of the support was from a combination of health professions student loans and guaranteed student loans. Almost $40 million, or 27 percent of the support, was made available to students through a combination of the Armed Forces Health Professions Scholarships, and the Physician Shortage Area Scholarships. Given the changes in the Federal programs of support discussed earlier, and particularly the planned increase in the support of service obligation scholarships, what impact will this have on availability of aid and the corresponding types of aid that students will seek?

The task force established by the AAMC has attempted to determine the answers to these questions. The provisions of the Health Professions Educational Assistance Act governing the level of capitation, the conditions of capitation, and the amount of federal support for service obligation scholarships have a direct bearing on the amount of aid available for medical students. If capitation levels are low, many schools will be obligated to increase their tuition; similarly, if they are unable or unwilling to meet the conditions established for capitation, they may have to increase tuition to meet the increasing costs of educating medical students.

In its first report to the Association of American Medical Colleges, the task force reported four major findings. The first finding was that

there was a shortage of financial aid for medical students. The financial aid shortage in 1977-78 is estimated to be $21 million.

This finding was supported by a study conducted by the National Planning Association under contract to the Robert Wood Johnson Foundation. The authors of the National Planning Association paper, John Craig and Michael Koleda, also concluded that the expansion of the National Health Service Corps program would have little impact on the financial aid shortage. Since significant expansion of the National Health Service Corps program is planned, this may appear paradoxical. Expansion of the National Health Service Corps does not significantly alter the need for financial aid funds because scholarships are not awarded to students on the basis of demonstrated financial need. Past experience has shown that the funds are more likely to go to students who have not demonstrated need. Furthermore, National Health Service Corps grants are large in comparison to the awards students usually receive from the schools they attend. Even if the student had been a recipient of financial aid in the past, the amount received might have been modest in comparison to the amount granted by the National Health Service Corps. The result is that there is not a dollar-for-dollar trade-off between National Health Service Corps grants and other forms of financial aid support.

The second finding was that the financial aid shortage will have its greatest impact on those students with limited access to personal or family financial resources. Direct evidence on the impact that the projected shortage of financial aid will have on students from low income backgrounds is difficult to obtain. Medical schools have significantly increased the representation of minority students in recent years from approximately two percent of the student body in 1970 to over ten percent in 1975. Since 1975 the percentage of minorities enrolling has remained stable. Experience has shown that over half the minority students require financial assistance—obviously shortages in aid will impact this group of students very severely.

Because the number of students applying for admission to medical school greatly exceeds the number of available places, there is little risk that places will go unfilled if financial aid is restricted. Instead, the process will eventually lead to the enrollment of greater numbers of students from high income families. A trend toward the enrollment of larger numbers of students from high income families is already underway.

The third finding was that increasing debt burdens will create increasingly serious repayment problems for physicians during the postgraduate years. The costs of attending medical school, particularly tuition at some schools, have rapidly increased in the past few years. George Washington and Georgetown, for instance, had to increase tuition sharply when capitation support from the District of Columbia ceased. The failure of the Federal capitation grants to keep pace with in-

flation has also stimulated increases in tuition. Some medical schools may not accept capitation grants in the future because of objections to the conditions that they must meet to maintain their eligibility. All of these factors contribute to tuition increases and in turn to increases in medical students' debts.

The average debt reported for graduating students in 1974 was approximately $9,000. However, individual students in this group may have debts considerably higher than that average. For example, at the University of Wisconsin medical school in 1976, the average graduate's debt was $12,000. Over ten percent of the students had debts in excess of $15,000 and several had debts in excess of $25,000.

Any major increase in medical school tuition will cause further increases in the student average debt. Also, if interest rates come close to or equal to commercial market rates they will become an additional financial problem for physicians during the immediate postgraduate years of residency. Residency training typically lasts three years. Average salaries for first year residents are expected to be $13,000 in 1977-78. Thus, if the new federally guaranteed loan program had been in effect and the student had borrowed the maximum of $50,000, at ten percent interest, the resident would be obligated to pay about 40 percent of his or her earnings for interest on this debt during the first year of residency. Requiring repayment of principal on top of this interest charge is simply an open invitation for the resident to declare bankruptcy.

The fourth finding was that the proposed federally guaranteed loan program for health professions students contained in the Health Professions Educational Assistance Act of 1976 does not appear to be a viable program to meet medical student loan needs.

The proposed program differs from the existing Guaranteed Student Loan Program in the following significant ways:

- it is a new program specifically for students in the health professions, including medical students;
- the maximum allowable loan is $10,000 per year with a total allowable debt of $50,000, but the loan may be used only to pay for educational expenses such as tuition and books;
- only 50 percent of the students in each medical school class are eligible to borrow from this program;
- a medical school must be eligible to receive Federal capitation in order for any of its students to participate in the loan program; and
- the interest rate is to be at commercial market levels—estimated to be between ten to twelve percent—and must be paid annually. This provision means that a student who borrows $10,000 for four years will be required to pay $4,000 in interest alone during his or her final year of study.

Four of these provisions deserve special mention. The restriction that no more than one-half of any medical school class may borrow under this program is apparently designed to ensure that a sufficient number of students will participate in the National Health Service Corps Scholar-

ship Program. The provision that the loans may be used only for educational expenses—specified as tuition, fees, books, and laboratory expenses—limits their value. Room, board, and other costs of personal maintenance may require additional borrowing, particularly for economically disadvantaged students. Third, to comply with the current capitation provisions, a medical school must agree to accept assignment by the Secretary of HEW of a number of U.S. citizens from foreign medical schools as transfer students. Unless this requirement is amended, many medical schools may elect not to be eligible for capitation, thus eliminating the opportunity for their students to borrow under the program. Finally, the financial elements of the program were proposed and written into the legislation without consulting the private banking community. In correspondence with the AAMC, leading bankers have indicated strong reservations about several aspects of the new loan program.

The long-term impact of current financial aid policies on the behavior and attitudes of future physicians, while difficult to gauge, may well be adverse. A student confronted with a problem of paying off a large, interest-accumulating debt could opt for a minimum period of postgraduate training and seek a practice location where the lack of certifiable clinical competencies would not hinder hospital staff appointment. While this might alleviate physician distribution problems, it could also result in a lower quality of medical care. Alternatively, a student in similar circumstances could seek training in one of the more lucrative specialty fields simply because of higher anticipated income. In both instances, it is reasonable to predict that neither physician would be particularly sensitive to the need for controlling health care costs.

The task force is not prepared to suggest what limits, if any, should be established for student borrowing. There is little agreement among economists or bankers about what constitutes a reasonable educational debt and what relationship the level of debt should bear to the individual's earnings. Members of the banking community have stated unequivocally that a debt of $50,000 for educational expenses is excessive; a benchmark generally accepted by economists has been that debt repayment should be limited to six percent of gross income. Some constraint on the growth of the debts borne by medical students seems warranted. The task force believes that selective Federal subsidies for medical students are reasonable and in the best public interest. The task force also believes that the earning capacity of physicians is a strong argument in favor of assistance through loans rather than grants, with the exception of grant support for financially disadvantaged students in their early years of medical school.

In its first report, the task force made a number of recommendations designed to help minimize the problems faced by students seeking aid in the fall of 1977. On a short-term basis, the Health Professions Loan Program should be funded at a higher level and on a one-time basis, the

borrowing limits under the Guaranteed Student Loan Program should be increased from $5,000 to $10,000 a year, with a lifetime limit increased to $20,000.

On a long-term basis, the task force proposed the establishment of a new federally guaranteed student loan program for medical students. The proposed loan program would attempt to incorporate the more desirable features of the new Federal guaranteed loan program for health professions students and the existing Guaranteed Student Loan Program. The model presented was based upon the assumption that it is difficult to justify Federal subsidies to underwrite the cost of medical education because of the high expected earnings of physicians. At the same time, it is quite clear that as the price of attending medical school increases, it will be extremely difficult for students to borrow to meet that cost and pay the interest while they are in school. The alternatives are either to accrue and compound interest or to provide an in-school interest subsidy. The task force proposed a program that would provide an interest subsidy paid by the Federal government while the borrower is in school but limited to students who demonstrate financial need.

The program would assure the availability of capital through a government guarantee to the lender. Schools, financial institutions, and states could be lenders under the program. The Student Loan Marketing Association would provide the source of funds either in the form of a forward commitment or as a secondary market. Such a program would parallel the present Guaranteed Student Loan Program to ease administration and eliminate confusion.

Maximum debt for medical students would be $50,000 and could not exceed $10,000 in any 12-month period. But, the funds may be used to offset the total cost of education including personal maintenance. The interest rate would be the same as that under the existing Guaranteed Student Loan Program including the special allowance. Students having demonstrated financial need would qualify for free Federal interest subsidy while in school and during the one-year grace period. Students without demonstrated financial need would pay full interest from the point of disbursement. In both cases repayment of principal would be deferred until one year after graduation. Unlike the Guaranteed Student Loan Program, there would be no special allowance subsidy during the repayment period and the interest rate would float quarterly.

There would be a fixed graduated repayment option offered to the borrower. Also, the number of years in payout would be based upon the size of debt; for example, a ten-year payout for a $15,000 debt; a fifteen-year payout for a debt of $15,000 to $25,000 and a twenty-year payout for a debt of $25,000 or more. For students engaged in advanced study who do not have access to sufficient income to make the interest payments, there could be provision for deferral of interest, which would be accrued and compounded. Finally, there would be a finance charge of up to one percent deducted from the loan at the point of disbursement.

The task force is now in the process of refining the characteristics of

the proposed program. When that is completed, the task force believes that the proposed loan program should be reviewed by representatives of the private banking community and of Sallie Mae. Recommendations from these interested parties should be sought before any attempt is made to legislate such a program in view of the task force's findings that the new federally guaranteed loan program for students in the health professions was written into P.L. 94-484 without such consultation. Prior consultation might have eliminated many of the undesirable features of this program and insured the development of a loan program with strong support from the medical schools, the banking community, and the Federal government.

The guaranteed loan program as proposed by the task force represents what appears to be an appropriate balance among the needs of students for financial assistance, their participation in sharing the financial aid costs through repayment of the loans plus interest, the willingness of lending institutions to provide funds, and modest participation by the Federal government, which would act as a guarantor and subsidize interest for financially needy students.

Before implementing any proposed loan program we must recognize the major differences in how medical schools are financed including the variations between states in the amount of direct financial support they provide. We must also recognize that the schools themselves have variable access to their own university sources of financial support. Financial aid policies for medical students are basically controlled by the Federal government. These policies should have sufficient breadth and flexibility to recognize the differences in how schools are financed, thus ensuring that students have the widest possible choice in selecting the schools they wish to attend.

Dr. Bernard Nelson received his B.A. from Stanford University in 1957 and his M.D. from Stanford Medical School in 1961. He became Assistant Dean for Student Affairs at Stanford Medical School in 1966, and Associate Dean for Student Affairs in 1968. In 1974 he became Associate Dean for Academic Affairs at the University of Wisconsin Medical School. Dr. Nelson is also a member of the Board of Directors of National Medical Fellowships, Inc.

A Long-Term Approach to Graduate Education Student Financial Assistance

Kurt L. Kendis

Mr. Kendis emphasizes the need for long range planning by all parties involved in the financial aid process. He notes that, although students' future incomes could be used as collateral for loans to fill the gap left by shrinking grant resources, the money market has failed to accept this concept, thus shifting the financial aid burden to the student's family. He points out the need for a comprehensive data base and concludes with recommendations for coordinated long-range planning efforts on the part of educational and financial institutions, state and Federal governments, and the students and their families.

The real issue in student aid financing is our inability to engage in long-range planning. Colleges and universities are only now developing tools to project costs and incomes, but long-range planning of tuition and financial assistance remains experimental. Government programs continue to proliferate, but there seem to be no plans for consolidation. Most families do not adequately plan for high costs that they will incur. As a result, increasing numbers of students are either denied access to funds for graduate studies or are forced to seek financial counseling from investment counselors who are not always motivated to stay abreast of the least costly financing alternatives.

Our system of graduate and professional education is a loose combination of legislated funds, private institutional resources, and the family's ability to either tap personal funds or borrow in capital markets. Although the issue often appears to be the difficulty of meeting each year's academic financial needs, I prefer to see the problem as a failure of this system and all its components to plan for the long-term financial needs.

In the past, graduate aid in the form of grants was a large part of this system. However, grant resources from both government and private sources have not kept pace with rising costs and are not expected to increase. In their absence, many if not most of the cost increases will be shifted, through tuition, to the students and their families. Given this observed failure of grant programs to provide adequate financial aid, past studies have focused on the possible use of an individual's future higher earnings as collateral for graduate loans.

Some of our work at the University of Pennsylvania has involved the simulation of a variety of loan programs. These simulations of long-term graduated repayment loan programs indicate that graduates can amortize even extraordinarily high debts. A modest insurance provision or tariff included within the interest rate can alleviate traditional concern for low income earners. Yet lenders appear to be reluctant to adopt income contingency or graduated repayments of these debts. They are not lending money to students without a guarantee or additional collateral. And as long as a student's access to capital is restricted by these market inefficiencies, the role of the family in financing graduate and professional education becomes increasingly important.

Loans to parents are one possible direction of commercial lending, with family assets as security and relatively high return to lenders. My own work with Bruce Johnstone investigated loans to parents as a means of financing higher education and relieving the impact on the family's cash flow. Educational loans to parents as presently offered by commercial sources are both expensive and short term and as such they do not ameliorate the financial burden of educational expense at all. Although we increasingly note renewed interest in educational tax credits, families are not the focus of government programs.

Also, as Dr. Breneman indicated, we do not have a precise idea of the dimension of student debt. Difficult as it is to coordinate government data on state or Federal loans, it is almost impossible to gauge the extent of private loans to students and families, such as family credit obligations through refinancing of homes.

The current difficulty in determining actual cumulative student debt is complicated further by the fact that the student debt is not always considered a family debt. Family financial planning, the way in which both students and parents view student debt obligations and the transfer of wealth from parent to child, now becomes a crucial issue in graduate education finance. Although present tuition levels create increasingly serious financing problems, colleges and universities have carefully avoided involvement with family financial planning and even though models of parental loan programs have been developed, only a handful of educational institutions offer them.

One added note is that private investment counselors are now finding a lucrative field even for families of modest wealth. There are notions of providing Clifford trust structures for these families to help alleviate the cash burden that they have to bear when their children are at school. Recently several money market instruments have been introduced; one was the EDUCO attempt to establish a tax deductible write-off for small corporations who were really incorporated doctors. These proposals are all intended to allevate the burden on a student trying to finance his or her education. But what they are really doing is increasing the long-term effective cost by providing a service for a fee. There might be a better way.

A further problem involved in financing graduate and professional

education in the context of a loose-knit system is that these market inefficiencies are compounded by informational inefficiencies. The media continue to show interest in spiraling tuition costs, the debatable usefulness of graduate education, the declining demand for certain professionals, and the possible projected oversupply of Ph.D.'s. The media also emphasize student loan default rates derived from inaccurate student loan default data, thus drawing attention away from the need for capital. Ironically, public attention to rising costs, imbalances in the Ph.D. and professional job markets, and increasing loan defaults do not appear to have altered demand in the short term. Recent acceleration of tuition has not brought rebellion among the ranks of professional students. Surprisingly, the media publicity has left graduate students and their parents insensitive to the long-range implications that these high costs have on the economic decisions that they must make.

Informational inefficiencies have also hampered research into the behavioral implications of high debt levels. Debt levels of graduate students have not yet reflected the past few years' costs increases, but students now entering graduate and professional schools can anticipate debt burdens that will strongly influence their choice of careers, their decisions to marry, their likelihood to declare bankruptcy or their decision to pursue further education. Little if any data exist that if linked with the available program data (inadequate as it is) would provide important insight into these long-range effects of debt on students' behavior. The eventual behavioral implications of high student debt may lead many to conclude that what we need is a complete dismantling of the system.

However, the real solution is to develop an ability on the part of all parties in the system to plan for the future. At present the sources of funds are not firm, the prices of education are set from year to year, the future availability of capital is not certain, and families continue to accumulate debt whose behavioral consequences have not yet been investigated.

We must reorient the focus of legislators, lenders, educators, and students and their families from short-term survival to long-range policy. Colleges and universities must recognize the market ramifications of their cost decisions and financial assistance policies and develop an ability to project the future consequences of tuition and aid. Too many of the system inputs are not certain early in the process. Too many of the data are not yet available on matriculation choice. Too many of the sources of internal funding are unknown. Yet, these problems are not insurmountable.

Universities must deal directly with the families of their graduate students and in a different way than they do with the families of undergraduates. Given longer range ideas of costs and the availability of grants and loans, they could solve the problem of assisting families in the financing of educational costs. Although reluctant to offer an investment counseling service, many universities recognize the need for this

service and the possible good will they might gain. Such a counseling service would attempt to involve institutions in the marketing technique of financial planning for students, prospective students, and their families. This kind of preplanning would involve the student in an economic choice when he incurs debt, rather than leaving debt as an unexpected burden.

Moreover, extensive presentation of probable earnings and employment opportunities with the consequences of graduate student debt might be a logical extension of the consumer protection provisions. So, counselors must be trained to use the new resources and data to better advise students and lenders of the long-range prospects for incomes and expenses. Underlying the counseling task must be the goal of investment in human capital for an anticipated increase in the net present value of future incomes.

Federal and state legislators must enact programs with as much forward funding as is possible since without a long-range commitment of government funds, planning is imprecise at best.

Incentives to long-range planning can be developed so that national analytic comparisons can deduce the need for policy change. Educational and labor statistics must be more thoroughly studied and, if necessary, restructured to better assist in assessing the demands for professional and graduate education.

Legislation should provide incentives and Federal funding for sound data maintenance and planning procedures including uniform methodology and file maintenance, and computer applications to central financial aid records. A consolidation of all loan programs into a national student loan bank is long overdue. Robert Mundheim's piece in the recent CEEB publication *Student Loans: Problems and Policy Alternatives* outlines the structure of such a bank.

This policy of forward funding for educational programs and the consolidation of the loan packages will enable colleges and universities to upgrade their planning processes, improve their own allocation of resources, and find optimum levels of tuition and fees. This ability to plan at the school level and to project demand for the nation as a whole also will enable national policy planners to project labor market supply and demand, cost and sources of funds, and need for support of capital markets. However, all is predicated on good data management and the use and maintenance of a central data base.

Access to professional education is dependent upon access to funds. Traditional lending has not modernized the money market for graduate student loans although portfolios of student paper provide an excellent return. We have not yet approached the optimum use of future income as collateral for loans.

If there is a rationale for predicting a turnabout in the underlying motivations of student financial assistance it must be the belief that soon the behavioral implications of high debt loads and the reliance on short-

term solutions will dramatize the unacceptable social costs and the severe long-term negative effect on the institutions involved.

Kurt Kendis was graduated from the Wharton School at the University of Pennsylvania in 1967. After a term in the Peace Corps and a post in the Ministry of Planning in Ivory Coast, West Africa, he returned to Pennsylvania for graduate work in economic development and participation in the United Nations International Comparisons Project. Since 1973, he has been a research associate of Dr. D. Bruce Johnstone in the Office of the President at University of Pennsylvania. Mr. Kendis's background as a systems analyst has furthered his efforts to use computer simulations to examine the cost and behavioral implications of student finance. His current work extends the interactive modeling techniques developed for student loans to university-wide modeling for the testing of marketing strategies for higher education.

Needs Analysis at the Graduate and Professional Level

Dwight H. Horch

Dwight Horch begins his paper with the history of the development of the national needs analysis system for student aid. He examines the increasing use of graduate needs analysis and how it differs from undergraduate needs analysis. Mr. Horch concludes with a list of suggested program characteristics that appear to be consistent with the needs of student borrowers, particularly as the levels of indebtedness increase among graduate students.

One relatively recent development in financing graduate education is the advent of needs analysis.

First, I will attempt to give a brief overview of the origins of needs analysis and reasons why many graduate and professional schools have turned to it. I will then touch on some of the issues in needs analysis at the graduate level and attempt to relate it to the Guaranteed Student Loan Program. Finally, I will share my observations on technical amendments to the Guaranteed Student Loan Program that, in my judgment, would make it more sensitive and attuned to both undergraduate and graduate students.

Financial needs analysis is hardly a recent development in higher education. A means test was used in the 1700s by Harvard College to award scholarships to needy students. Needs analysis became national in scope in 1954 with the creation of the College Scholarship Service by the College Board. Then, a group of largely private institutions agreed upon a common set of principles and procedures to award scarce institutional aid to the neediest students.

Needs analysis was first viewed as a method to minimize the practice of buying students, and enable students to choose institutions on educational rather than financial grounds. With the establishment in 1958 of the National Defense Student Loan Program, and later the Educational Opportunity Grant Program and College Work-Study Program, needs analysis came of age as an instrument of social policy.

Coincidentally, during the 1960s when financial aid was becoming plentiful at the undergraduate level, graduate schools were experiencing what in retrospect has been referred to as the golden age. By the close of the decade, however, Federal financial support for graduate students

began to decline, as the National Board on Graduate Education documented so well. So, by the early 1970s, Federal support for graduate students had declined to about a third of the support available in 1967. Faced with rapidly rising costs and dwindling financial aid, graduate deans at many of the same prestigious private institutions that formed the College Scholarship Service confronted the same dilemma as their undergraduate counterparts had 17 years earlier: how best to allocate scant institutionally funded aid. These graduate deans, through the Graduate Record Examinations Board, approached Educational Testing Service about the possibility of developing and implementing a needs analysis service specifically for graduate students.

At about the same time, representatives of the Law School Admission Council, the Graduate Management Admission Council, and the Group on Student Affairs of the Association of American Medical Colleges expressed interest in the development of a national needs analysis agency for graduate and professional students. And so, in November 1971, ETS and the College Board convened an Invitational Conference to explore avenues for development of a cooperative financial aid application form and analysis procedures for graduate and professional students. The outcome of the conference was the development and implementation in 1972 of the Graduate and Professional School Financial Aid Service (GAPSFAS).

While the notion of financial needs analysis had been commonplace for years among professional schools, particularly law and medical schools, it was, and still is to an extent, viewed by some as a radical turn of events for graduate schools of arts and sciences. I don't believe it would be an overstatement that to some deans, the thought of considering a student's financial need, in addition to academic promise, is downright distasteful. Nevertheless, some 120 graduate schools of arts and sciences, 85 law schools, 40 graduate business schools, 50 medical and dental schools, and 25 theological schools participate in the service. Nearly 70,000 graduate and professional students will participate in it this year and will direct 160,000 reports to be sent to schools. Surprising to me is the fact that almost all participating schools require parental information for some or all students; and 80 percent of the parents of students in the population supply personal financial information.

You might wonder how graduate and professional schools use needs analysis in their award of institutional financial aid. It is really quite difficult to generalize across user schools. Of course, needs analysis reports for graduate and professional schools are used in much the same way as for undergraduates when it comes to determining eligibility for National Direct Student Loans and College Work-Study jobs. The student's resources, including an estimate of parental contribution, is subtracted from the student's expense budget to arrive at need. For the Guaranteed Student Loan Program, it is used in a similar fashion to determine interest subsidy eligibility for students whose parental incomes exceed $25,000. The parental contribution estimate is used as a guideline by

some schools to determine the amount of institutional loan or guaranteed loan that the student is expected to take out. Stated differently, many graduate and professional schools don't actually expect the student's parents to make a cash contribution; rather, they expect the student to borrow an equivalent amount to replace parental contribution.

When it comes to awarding fellowships, evaluation of a student's academic promise is still a critical determinant. When need is considered, it is considered roughly. It is my experience that graduate schools of arts and sciences do not tie stipends directly to need, but rather group students by level of need. Thus, a school may determine it will award X number of $1,000 fellowships, Y number of $2,000 fellowships, and Z number of $3,000 fellowships. The needs analysis is used to slot applicants by stipend level. The practice of using need in connection with fellowship selection does not seem prevalent among public institutions but it appears to be a recent phenomenon among select private institutions.

Few, if any, graduate schools use needs analysis to determine eligibility for assistantships or traineeships except to the extent that the student might qualify for a CWSP-funded assistantship.

Just to summarize, use of needs analysis by professional schools of law and medicine is not a new development. What is new is that graduate and professional school representatives are acting in concert to sponsor a needs analysis program. And, out of necessity, many private graduate schools of arts and sciences have had to seek larger institutional budget allocations for fellowships, and are gearing stipend levels to need.

The recent College Board publication edited by Lois Rice entitled *Student Loans: Problems and Policy Alternatives* contains an excellent paper by Bruce Johnstone. In discussing the meaning and relevance of need in connection with the Guaranteed Student Loan Program, Johnstone makes the point that "as long as loans carry significant subsidies and have to be rationed by any device other than the market, need will continue to be an important, although obfuscating, part of the picture."

"Need" may be any one of three types: perceived need, absolute need, or relative need.

If you ask parents whose income is $9,000 per year and whose expected contribution is zero if they need money for college, the answer will surely be yes. If you ask parents who earn $30,000 per year if they need financial help, the answer is likely to be; "you must be putting me on, sure we do." These are examples of perceived need. When we speak of financial need, we generally imply relative need, which is the difference between the cost of education and a measure of the student's or parents' measured ability to pay those costs from income and assets. By this definition, a student's need is relative and will vary because costs differ from school to school.

Let's take an example of a family whose computed contribution is $4,000 and whose son or daughter is considering attending either a

public university costing $3,000 per year or a private university costing $6,000. At the public institution, the family's relative need would be zero; its relative need at the private institution would be $2,000. The family's absolute need, the amount it must come up with each year, would be $3,000. These distinctions are important because need is used as a criterion to target financial aid to intended student populations. BEOG eligibility used to be a function of both absolute and relative need. To be eligible under old BEOG rules, the parental contribution, or absolute need, had to be less than $600. If the family passed the absolute need test, the student was eligible to receive a BEOG stipend equal to one-half of its relative need or $1,000.

Use of combined measures of relative and absolute need is not uncommon in determining eligibility for Federal student aid programs including the BEOG and GSL programs. A student can qualify for interest subsidy on a guaranteed student loan if the family's adjusted income is $25,000 a year or less. If the family's income exceeds $25,000, a student may still qualify for interest benefits if relative need can be demonstrated. Moreover, a student may take out a guaranteed student loan to replace parental contribution (absolute need) or fill relative need.

There are two basic issues in needs analysis at the graduate and professional level. Whether needs analysis has a rightful place in graduate and professional financial aid administration and if parental finances are considered at all, how much should parents be expected to contribute?

First, let us consider whether and to what extent parents should be expected to contribute. Most of the more than 300 schools that participate in the GAPSFAS believe that parental resources should be considered, and that parents should be expected to either contribute or loan funds to the student. One the other hand, some schools do not expect the parent to contribute; rather, they expect the student to borrow an amount equivalent to any parental contribution. There is also belief that parents of graduate and professional students should not be expected to contribute as much toward graduate or professional school costs as toward undergraduate costs.

Therefore, the question should not be how much can parents contribute toward graduate and professional education but how can loan programs be improved to enable graduate and professional students to borrow against their future income?

In most discussions of loan programs, concern is frequently expressed about intolerable and tolerable debt levels. In this year's GAPSFAS application, an item was included to elicit information from students about the size of their educational debts. Forty-seven percent reported that they had borrowed some amount during their undergraduate years. Only about one-half of one percent of the entering students had borrowed more than $10,000, but over 26 percent of the fourth year graduate and professional students had borrowed over

$10,000. Ten percent of the borrowers in their fourth year of graduate or professional study had borrowed in excess of $16,000.

For those unmarried students who had borrowed, the median amounts are as follows: first year, $2,684; second year, $3,709; third year, $5,458; fourth year, $7,899. These figures suggest that graduate and professional students can expect to triple their undergraduate indebtedness—a fact that attests to the crucial role of loans in financing graduate and professional study.

Existing loan programs could be improved if the Guaranteed Student Loan Program permitted heavily indebted graduate and professional students the option of repaying at a higher interest rate over a 15-year period and if students were allowed to make graduated repayments if they elected to repay in the standard ten-year period. Also, a national student loan bank could be established to permit students who have borrowed from GSLP, NDSL, HPSL to consolidate their debts into one note for repayment purposes.

At the undergraduate level, a guaranteed parental loan program could be established to permit parents to borrow their expected contributions and spread repayments over more reasonable time periods. The present structure of the Guaranteed Student Loan Program encourages parents to pass on their obligations to contribute to the student. Permitting parents as well as students to borrow under the Guaranteed Student Loan Program would require some restructuring of the program but I believe such restructuring would make it a better program.

It would help middle income parents who cannot come up with their annual parental contributions because their income is largely illiquid. It would minimize the debt load of dependent undergraduate students and ultimately reduce indebtedness of entering graduate and professional students. An argument could be made that as an alternative to tax credits, loans to parents, like student loans, should be guaranteed and their interest rate should be lower than the prevailing market rate. The Federal cost of loans to parents would be cheaper because in-school interest subsidy payments would be less. We could also expect to see a lower default rate. In addition, the repayment period would begin immediately and the life of the loan, at the undergraduate level, could be as little as eight years compared to the present fourteen years, nine months, if parents were allowed two years to repay each year's expected contribution.

A guaranteed parental loan program would not be much more complex to administer than the student program. Such a program would help independent undergraduate and graduate or professional students by minimizing the aggregate debt of entering graduate and professional students. If one agrees with the proposition that parents should have little or no obligation to make an actual cash contribution to graduate or professional education, then it is at that point that students should be

encouraged to assume the full burden of debt themselves. The present Guaranteed Student Loan Program allows them this option, but could be improved by allowing extended repayment periods or optional graduated repayments.

The proposal to allow parents to borrow their expected contribution uses a measure of absolute need to determine eligibility. Lower income families have little absolute need (i.e., low expected parental contribution) but high relative need. Because meeting their needs should have highest priority, a strong argument could be made that the government should subsidize their loans more than loans to middle and upper middle income families, and should insure that capital is available to them. For these reasons, we should encourage expanded funding of the National Direct Student Loan Program which is a program based on relative need, and which carries with it a higher public subsidy than the Guaranteed Student Loan Program. I do not mean to suggest that there should be a graduate level BEOG. But, an argument can be made that grant funds should be available to aid the lowest income students during their first transition year.

Finally, let us consider whether needs analysis should have a rightful place at the graduate and professional level. The 1960s were vintage years insofar as Federal support for graduate aid was concerned. Because aid was bountiful, there really wasn't much reason for graduate schools to consider financial need in the 1960s. On the other hand, the Federal government has not been a major source of financial aid for students attending professional schools and for some time, professional schools have used needs analysis as a method of rationing scarce funds.

To the extent that funds for graduate and professional student support are scarce, to the extent that costs are skyrocketing, and to the extent that graduate and professional schools must compete for funds from university budgets for fellowship support, needs analysis does have a place. Although needs analysis is used by private institutions for awarding fellowships, it has not been widely accepted by public graduate schools where the primary form of aid is assistantships. Whether or not needs analysis will find a place at public graduate schools will depend upon continued support of current funding patterns by state legislators.

The massive infusion of Federal student aid funds for undergraduate students has had a resounding effect at the graduate and professional level. Despite its trials and tribulations, the basic grant program has been a success. It has opened doors to postsecondary opportunity for millions of students. It has raised levels of hope and expectation of its beneficiaries. Needs analysis at the graduate and professional level is necessary if we are to continue to fulfill our societal commitment to these young people.

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Graduate and Professional Education and the Public Interest

Stephen P. Dresch

Dr. Stephen Dresch argues that many of the problems in our present system of financing higher education can be traced to its use in accomplishing the objective of our national social programs. This approach results in great inefficiencies and appears detrimental to both the educational system and the social programs. Dr. Dresch also notes the alliance between the professions, especially medicine, and the various state or Federal government agencies whose combined effort manages to restrict entry into the professional schools and thereby to enhance their unrelated interests of restricting supply while holding down growth in public subsidies to education. Dresch also emphasizes the role of general market failures such as the restrictions on credit to individuals seeking financing, the prerequisites established for entry into various careers, and the absence of insurance pools to shift the risk of failure over a broader populace. He concludes by offering a number of new suggestions calling for more thorough overhaul of the entire educational market.

Issues of public policy in the domains of graduate and professional education obviously cannot be discussed in a vacuum. The very term profession refers to an area of practice, to the application for remuneration of knowledge and expertise, not simply to the acquisition of that knowledge and expertise, and it is, furthermore, concern with application that underlies the public policy interest in professional education. Apart from the "applied sciences" it is less clear that advanced education in the arts and sciences is related to practice in any conventional sense, and public policy has, at least historically, exhibited a corresponding indifference to graduate education.

Thus, public policy interest has originated with a concern for the flow of new entrants into fields of professional practice. Interestingly, however, until the very recent past the effective objective of policy action has not been to augment and increase the flow of new entrants, but to retard and control that flow. Under the guise of ensuring the quality of professional practice, for example, in medicine or the law, legislative actions and administrative processes have provided the mechanisms by which the professions could insulate themselves from the competitive pres-

sures that freedom of entry would give rise to. Thus, control of the quantity, quality, and content of professional education constituted the means by which the professions regulated the supply of professional services, ensuring the maintenance of monopoly rents accruing to those few who were admitted to practice.

To a high degree our current public concern with professional education originates from this historical role of public policy, as the device by which otherwise fragmented private interests were able to secure monopoly power, and from the critical role of professional education within this collusive system, as the device by which entry could be restricted. However, two interacting developments have served to undermine the stability of the established order. First, economy-wide changes in technology and economic organization, especially over the last half-century, generated a major increase in the demand for the highly educated in general. This rapid growth of demand, outrunning the growth of supply over most of the period, gave rise to sustained high returns to the highly educated; and as the highly educated increased as a proportion of the labor force, the existence and maintenance of economic rewards focused attention on education as a device for at least intergenerational improvements in social status and material welfare. Thus, unequal access to education came to be seen as a barrier to achievement of egalitarian social objectives; or alternatively stated, education became the device by which, in the absence of an effective social commitment to a more equal distribution of income and wealth, an ostensible commitment to equity could be served. And especially in light of the pronounced economic and social rewards associated with the professions, this focus came to bear with particular intensity on professional education, in which the power of the state itself had traditionally enforced restrictions on access.

In the case of undergraduate education, no organized interests opposed the expansion of supply, and the direction of state action, in response to the excess demand for higher education, was to augment the capacity of the system. Thus, over the fifteen year period 1956 to 1971, the total number of bachelor's and first professional degrees awarded annually increased by 184 percent. However, over the same period, the number of medical degrees awarded increased by only 31 percent. Reflecting less effective organizations of and control by the legal profession, the number of law degrees awarded increased by 111 percent. Clearly, while the issue of access to higher education in general could be defused through expansion, the power of organized professional interests precluded that response in the sphere of professional education. Thus, while access has become an ever more attenuated issue at the undergraduate level, especially as the economic rewards to higher education have rapidly contracted since 1970, it has become an increasingly divisive issue at the professional level, where the success of the organized professions in restricting entry has served to maintain excess

demands for services, and thus monopoly rents to practitioners and queues at the highly subsidized professional school gates.

The second development that had undermined the status quo in professional, especially medical, education is closely related to the foregoing. Between 1955 and 1965 the population of the U.S. increased by over 18 percent; over the same period, per capita disposable income (in constant dollars) increased by 25 percent. Together, these developments would have been expected to increase the real demand for, for example, medical care by at least 18 percent, and possible by 48 percent or more if consumption relative to income had remained constant or increased. In fact, the number of physicians in the population increased by 20 percent, but after making allowances for retired and other nonpracticing physicians, the ratio of active physicians to population remained virtually constant. Thus, it is not surprising that per capita expenditures for physician services, and receipts per physician, more than doubled over this ten year period, while total health care expenditure increased by only 50 percent. In short, increasing demands for medical care, reflecting the growth of real income and of population, were translated primarily into increased relative prices for physicians' services, not into an increased flow of health care.

The success of the medical sector, operating through the state, in restricting entry can be credited with the effective frustration of rising demands for medical care, but the degree of frustration thus induced rendered this a short-lived, ultimately Pyrrhic victory. While this frustration has been vented in a variety of ways, in the area of medical education concerns with underserved areas and groups, specialty distributions, etc., have come to the fore in public policy debate over the last decade. Thus, government, as the mechanism by which access was restricted and monopoly sustained, has been forced to intervene to compensate at least partially for the resultant consequences.

In brief, current policy interest in professional education originates with the historical role of the public sector in restricting access and with the inadequacies of professional practice that can to at least some degree be attributed to these restrictions on the characteristics and rate of inflow of new personnel.

In the case of graduate education in the arts and sciences, the situation is somewhat different. If public policy exhibited a historical indifference to graduate education, this attitude was radically reversed in the 1950s with the rapid growth of higher education, creating a substantial excess demand for faculty, especially in the greatly expanding public sector, and the simultaneous explosion of research demands, also emanating especially from the public sector. With the sudden recognition of a "need" for the highly educated, the obvious reaction was to create a governmentally organized and financed supply.

Unfortunately, the "need" that motivated this action lasted for little more than a decade, as declining rates of population growth and college

attendance reduced the demand for faculty and as research demands subsided. Yet, the legacy of governmental responsibility remains. Thus, there arise such issues as the asserted dependence of U.S. scientific vitality on the graduate education sector, the need to "create" new sources of demand for Ph.D.'s, etc. It might be noted, parenthetically, that the reversal of governmental policy in the professional education area over the last decade, for example, the shift from a policy of restricting growth to one of actively underwriting growth, may well lead to similar issues in this area over the next decade, especially in medical education, in which governmentally sponsored and financed expansions have been greatest and to which an ever increasing share of biomedical research has been channeled.

In the context of these patterns of historical development, it is important to step back and ask the fundamental question: Are there any compelling bases for public policy interest in the terms of access confronting potential entrants into graduate and professional education? For any such basis to be compelling, terms of access that would prevail in the absence of governmental intervention must be found to be either inefficient or inequitable.

Inefficiencies of two distinct types have been proclaimed as justifications for governmental action. First, social or external benefits have been asserted to flow from at least certain types of advanced education and training: Social benefits of a diffuse nature may derive from a more highly-educated population; specific social benefits, related, for example, to public health or to the rate of economic growth, may derive from certain activities of persons with particular types of education or training; joint or secondary products, such as research, may be associated with the educational process itself; and educational policies and programs may provide mechanisms for achieving other social objectives—extension of medical care or legal services to underserved areas or populations. Social or external benefits of these types give rise to inefficiency because they represent benefits that are not captured by the individual deciding on the type and level of investment in education that he or she should undertake. As a result, individual decisions, based on perceived private benefits, can be expected to result in underinvestment from a social perspective. Considerations of this sort have provided the justification for general or targeted subsidies to at least some components (students and/or institutions) of the higher-cum-professional education system, altering terms of access (prices, criteria for entry) in order to induce an increase in the aggregate flow of persons into, through and out of the educational establishment or its component parts.

I would suggest, however, that ostensible social or external benefits constitute an exceptionally weak basis for advocating public support of or involvement in advanced education and training. Virtually every specific example advanced involves either a particular postschooling employment or activity of the highly educated individual or an asserted

joint-product relationship. In the first case, whether the social benefit consists of the flow of returns to research or to the provision of particular services to target purportedly underserved groups, to attempt to secure the benefit through support of education is to rely on a mechanism that is itself highly inefficient on at least two counts. First, much of the benefit will be diffused to nonpreferred activities and uses. Second, all users, preferred and nonpreferred, will perceive highly trained personnel to be less valuable than they in fact are; paying only a fraction of the price (wage) that would be observed were education unsubsidized, all users will have an incentive to substitute more for less highly qualified personnel, when the total provision of services could be expanded with lesser real resource costs, including the resources devoted to education and training, were training unsubsidized and were some fraction (necessarily less than 100 percent) of the erstwhile subsidies devoted to the direct provison of the target services.

Thus, for example, if the objective is to provide medical care to an underserved geographic area, the solution of subsidizing the expansion of medical schools, flooding the market with M.D.'s such that their earnings in more desirable locations fall to the point that at least some are willing to enter practice in less desirable locations, must be viewed as an absurd solution. The greatest share of the gross benefit accrues to those in glutted areas, who pay lower prices for physician services, and because of the artificially low relative price attached to their services, physicians are utilized to perform functions that could be more efficiently performed by other, less highly trained and less human-capital-intensive personnel. Given freedom of access to unsubsidized and quantitatively and qualitatively unregulated medical education, the alternative of providing "bounties" for practice in underserved areas, or alternatively, lump-sum taxes for practice in over-served areas, will involve significantly lower resource costs. Parenthetically, it should be observed that this leaves aside the even more basic issue of whether the ostensible beneficiaries themselves would in fact prefer the subsidized service, medical care, rather than a transfer of equivalent general purchasing power. Despite its patent absurdity, however, the "flood the market" strategy constitutes an important, if schizophrenic, component of current public policy, that involves increasing the scale of medical schools, but almost undoubtedly by less than would be observed if new, unsubsidized schools could enter in response to excess demands for medical education, providing large state and Federal subsidies to all students, notwithstanding the queues at the gates clamoring for admission, and finally, in a gesture toward rationality, providing limited bounties in the form of scholarships and/or loan forgiveness in exchange for agreements for at least temporary service in target areas.

The joint-product argument for support of advanced education and training is, if possible, even weaker than the post-schooling employment arguments. This argument rests on the wool-mutton analogy and effectively asserts that advanced research or some comparable social good is

akin to a sheep, sprouting forth wooly Ph.D.'s, or vice versa. This wool-mutton analogy is perhaps the most deleterious contribution to society of the traditional introductory economics course, since, in fact, there are probably no truly joint products—two products so related in production that to obtain more of one requires accepting proportionately more of the other as well. At the margin, all products are substitutes.

It is certainly true that an expansion in advanced education is likely to encourage research and knowledge production. However, this alone can hardly be taken as a justification for the expansion of the educational enterprise. A given increase in research activity can clearly be achieved directly at a lesser real resource cost. Research and education may indeed be interdependent in production, an increase in the scale of either may reduce the relative cost of an increment of activity in the other, but the relationship can hardly be characterized as strict and unavoidable complementarity. Thus, again, direct subsidization of the target activity, research, permitting the education enterprise to find its own appropriate scale and relationship to research, is required if resources, for both education and research, are to be efficiently allocated.

A second, very different efficiency issue, that provides the primary focus of this discussion, derives from what can be more narrowly characterized as market failures. The problem here is not that education gives rise to benefits that are not perceived (captured) by the individual, and hence that individuals purposefully underinvest in education, but rather that individuals face constraints that unnecessarily preclude educational investment that they would choose to make under more ideal circumstances. A panoply of market failures that might give rise to inefficiency in the level and/or composition of educational or, more generally, human capital investments can be suggested: monopoly or collusive oligopoly on the part of suppliers of educational services, barriers to and/or arbitrary prerequisites for entry into various occupations imposed by similarly collusive and monopolistic professional associations and unions, capital market imperfections that deny individuals access to means of financing educational investments on terms comparable to those on which other investments can be financed, and "insurance market" failures that preclude appropriate shifting and/or pooling of the risks of educational investments. Each of these can reasonably be expected in fact to constitute a significant source of inefficiency, resulting in a misallocation of resources to and within education.

In addition to distortions in the allocation of resources to education, these sources of inefficiency are commonly perceived as inequitable in their consequences for individuals. This is especially true of the first two noted above, involving arbitrary restrictions on access either to education and training or to postschooling opportunities for employment. These necessarily involve the rationing of opportunities, and whether that rationing is implemented on the basis of a random draw, of parental contacts, occupation or social standing, or of race or sex, the result is in-

evitably to discriminate against the excluded relative to the included. Thus, some could be inequitably treated, not by those admitted, on whatever basis, to law or medical school, but by a system that highly subsidizes opportunities for education and later economic rewards, while simultaneously limiting the supply of educational opportunities below that for which the artificially low prices create a demand.

Capital and insurance market failures can also be expected to impinge differentially, and inequitably on different individuals. Persons with greater wealth (command over resources) find their educational opportunities less severely constrained than those with lesser wealth. Note, however, that inequity is not necessarily implied by the fact persons with lesser wealth acquire less education than those with greater wealth. On the contrary, if education represented a pure consumer good, and if those with lesser income and wealth chose to consume less education than those with greater income and wealth, just as they choose to consume less housing, less expensive food, etc., then differential access to (consumption of) education would constitute no greater an inequity than differential access to any other source of satisfaction. In short, the issue of equity with respect to access to education, as distinct from access to income and wealth generally, can arise only if education is inefficiently provided, for example, if market failures more severely constrain the opportunities of those with lesser income and wealth. Otherwise, the essential issue is one of equity in the distribution of income and wealth, not of equity in access to education. Thus, observed differences in educational attainments across, for example, family income groups provide an index of inequity only to the degree to which these are a result of market failure. In short, what appears to be an "equity and efficiency" problem can be viewed, ultimately, in purely efficiency terms: Because of market failures, for example, inadequate access to capital markets, individuals, especially those with lesser income and wealth, invest less in human capital than would otherwise be the case. Equity considerations, then, can arise only as a byproduct of more fundamental inefficiencies that impinge differentially upon individuals enjoying different financial capabilities.

Capital market failures can, in general, be expected to result in lesser educational investment than would be observed if access to capital could be provided on a nondiscriminatory basis vis-a-vis other types of investment. Clearly, however, the consequences of capital market imperfection will necessarily be less serious for the wealthy than for the poor. Students from high income-wealth families enjoy ready access to funds for educational investment, within the family, at implicit interest rates comparable to those that would be incurred in the financing of other types of investment. Even if high income families hold their wealth in relatively illiquid forms, such as owner-occupied housing, it is still possible for a family to finance the education of its offspring by using such illiquid assets as collateral for a loan; this choice simply represents a portfolio decision on the part of the family unit.

In contrast, apart from governmentally-sponsored loan programs that themselves incorporate substantial subsidies and thus necessitate discriminatory rationing, lower income students face virtually nonexistent capital market opportunities. The student without direct or indirect claim on other assets can offer only his future earnings as security to a lender. However, although education, especially at the graduate and professional levels, represents primarily an investment by the individual in human capital that will give rise to a flow of future earnings, constitutional strictures against involuntary servitude, and associated bankruptcy laws, render this asset effectively valueless as collateral. As a result, capital market access is either foreclosed or is available only on terms that are so unfavorable, with respect to the cost of funds, terms of repayment, etc., as to render an otherwise attractive educational investment economically undesirable.

Insurance market failures appear to be even more general in their consequences for individual investment behavior. The risks associated with investments in education are incontrovertibly high. Even controlling for such factors as family background and ability, the variance of the returns to education is generally greater than that of other assets. Furthermore, available evidence suggests that the variance in returns rises monotonically with the level of educational attainment.

The impact of the inherent risks associated with alternative assets on decisions regarding the level and composition of investment will depend, of course, on the individual investor's attitude toward risk. The more risk averse he is, the less he will be willing to invest in a high risk asset; only a risk neutral individual will ignore risk and base his investment decisions entirely on mean expected returns. Thus, unless potential human capital investors are risk neutral or, a less likely possibility, are risk seeking, positively value higher risk and are willing to sacrifice expected returns for greater variance, the failure of the insurance market to provide mechanisms for the shifting or pooling of the insurable risks associated with human capital investment, and hence for reducing the risks as perceived by the individual, will lead to underinvestment in education.

Of course, some risks, such as the risk of flood for those occupying a flood plain, are by their very nature uninsurable, simply because, should the contingency occur, it befalls everyone who might wish to insure against it. In these cases the lesser investment undertaken by risk averse individuals cannot be characterized a priori as suboptimal, although there may be circumstances in which society would find it desirable to indemnify individuals against an uninsurable risk. In the more general case, in which risks are of an insurable nature, the failure of the insurance market to provide protection to individuals will result in suboptimal rates of investment.

Again, interpersonal differences in degrees of risk aversion (unwillingness to bear risk) will imply differential consequences of insurance market failure. Underinvestment, and hence loss of welfare, will be con-

centrated among those who are most risk averse, while the welfare of the risk neutral will be unaffected. And, it is certainly possible that these differences in attitudes toward risk are related to family income and wealth, giving rise to a systematic and socially pernicious inequity. However, as in the case of capital market failure, the fundamental issue is one of inefficiency. Providing for the more efficient functioning of insurance markets will simultaneously rectify any related, secondary social inequities resulting from differential risk aversion.

Ultimately perhaps even more serious than the associated equity consequences, insurance market failures may have critical implications for the characteristics of persons entering occupations requiring large investments in high levels of education and training. The unavailability of insurance against risk may lead to an important, systematic basis in these characteristics, as those who are risk averse are deterred and as a result the risk-neutral and risk-seeking become predominant in the ranks of professional practitioners. Furthermore, this tendency may be self-reinforcing, as established members of these occupations, themselves systematically selected, exert control over the highly rationed entry of new members, explicitly or implicitly imposing corresponding attitudes toward risk as a prerequisite for admission, with further reinforcement of these attitudes in the course of education and training. How and to what extent this process of systematic selection and self-selection, leading to greater prevalence of risk-seeking attitudes, will alter the quality and character of services and standards and patterns of conduct and behavior in the professions is an issue beyond the scope of this discussion. However, it appears self-evident that these effects may be quite pronounced, fundamentally influencing the nature and qualitative character of performance in such socially sensitive and pivotal occupations as medicine and law. Thus, improvement of insurance market performance may lead not only to more optimal levels of educational investment but also to pronounced changes in the quality of service provided by the highly educated, and this effect offers perhaps the strongest incentive for correcting insurance market failure.

The suboptimal level and composition of investment in human capital that can be expected to result from inadequate access to capital and insurance markets could be compensated, in principal, via educational subsidies, related to family income and wealth and to other individual characteristics leading to differential consequences of market failure. However, recourse to subsidies may introduce other, equally pernicious inequities and inefficiencies: Need-based grants to students represent both artificial reductions in the cost of education as perceived by the recipient, and also selective wealth transfers, differentially benefitting those who acquire education relative to those who do not. It is the former characteristic, of course, by which subsidies effectively compensate for the adverse efficiency consequences of capital and insurance market failure. However, unless the subsidizing authority is sufficiently astute to provide grants that are just sufficient to compensate for the

investment-depressing consequences of market failure, recipients may be led to invest in education even though its expected rate of return is less than could be achieved through alternative uses of funds; if market failures were directly rectified and the subsidies or subsidy-restrictions were removed, the subsidy-recipient would choose to reduce his educational outlays. Under these circumstances the restriction of the subsidy will lead to overinvestment in education. And because only the private rate of return to education is relevant in the case of capital and insurance market failure, there is in this instance no justifiable basis for favoring the greater education investment.

Even if subsidies were just sufficient to compensate for market failures and hence did not give rise to aggregate overinvestment in education, these subsidies would still represent discriminatory wealth transfers to beneficiaries (students) relative to nonbeneficiaries (non-students), giving rise to an inequity that is simultaneously quasi-horizontal (different persons from families with identical income and wealth, and also different persons with identical lifetime incomes although from families with different income and wealth, receive different benefits) and quasi-vertical (of two persons, whether from identical or from different family income-wealth backgrounds, the one who becomes more highly educated, and because of family income recieves the benefit, will, on average, experience higher earnings over his lifetime). This inequity is only compounded by the fact that individuals from families with very different income and wealth may not receive comparably different "inheritances," or even temporary access to capital, from their families, contrary to the assumption underlying need-based grants, differences in family income and wealth may provide a very inaccurate index of differences in resources available to students, differences for which the grants are designed to compensate.

The ultimate point, I would suggest, is that considerations of income and wealth distribution should be divorced from educational policy considerations, and specifically, that efficiency issues involving "access to education" should not be confused with the fundamental social issues involving "access to wealth." And in fact, it is unnecessary to compensate for capital and insurance market imperfections via grants, much less more generalized educational subsidies, if devices for improving these markets can be devised, which I would assert can indeed be accomplished.

The general conclusion is inescapable: Equity and efficiency, in the schooling (human capital formation) process, in labor markets and related final output markets, and in the provision of such public goods as research, require vastly less, not more governmental intrusion, whether fiscal or regulatory, into the terms of access to advanced education and training. Only in the case of capital and insurance market failure can a persuasive case be made for governmental action, and even here the more desirable contribution may be to facilitate and encourage private action rather than to intervene directly.

The argument against direct Federal action becomes most compelling when the horrendous characteristics of previous Federal action in the capital market domain are considered. To list just a few of these,

- Federally sponsored loans have been highly subsidized, leading to nonoptimal rationing of funds, possible overinvestment in schooling on the part of those able to acquire funds and a nonoptimal level and composition of investment in human capital by both the served and the unserved, and windfall gains to those who are provided access to capital, especially to students relative to nonstudents.
- Terms of repayment—the length of the repayment period and the temporal profile of repayment—have been unduly restricted, again to a high degree a result of the need to limit the degree of effective subsidization.
- Not only has the problem of collateralizing future earnings not been faced requiring, as it will, coming to grips with issues of bankruptcy and Constitutional (Thirteenth Amendment) protections against involuntary servitude; rather existing programs actually encourage default and bankruptcy, thus further limiting capital and market opportunities.

If these are indicative of the inefficiencies and inequities that have been incorporated in federally-sponsored capital market programs, I leave it to your imagination to anticipate the bizarre consequences were the Federal government to undertake directly the development of insurance mechanisms that would attempt to pool the risks faced by persons undertaking advanced education and training. Consider, for example, the inefficiencies and inequities that would result from a failure to segregate persons with very different income expectations into separate risk pools.

The appropriate direction for public policy, I would argue, is not to begin with the premise that markets, especially capital and insurance markets, have failed (a premise that is obvious), and then to proceed immediately to the putative rectification of these by direct fiscal and regulatory action, such as subsidies to selected schools and students, rationing of funds and of educational opportunities, subsidization of loans to the select, ad infinitum, but rather to assess why these markets have failed and then to undertake those statutory and Constitutional changes that will be required if freedom of access to the full spectrum of life's opportunities is truly to be provided to all.

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PART II: COMMENTARY

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If you look at graduate education in the arts and sciences today, I believe about two-thirds of the students are part-time. That is a terribly important fact in terms of the financing of graduate education. Whereas medicine tends to be a full-time pursuit, law and business, to a tremendous degree in this country are now part-time pursuits. Even more important, about one-quarter of the Ph.D.'s being awarded in this country at the present time are going to women. I have seen figures that indicate that by the mid-1980s, approximately one-third will be going to women. That is up from about ten percent not too many years ago.

Let me give you some other figures. In 1967, of the approximately 65,000 students in law programs in this country, only 3,000 were women. In 1976, 30,000 of the 115,000 law students were women, or about 25 percent. It is my general impression that of the class entering medical schools in the fall of 1976, about one-quarter were women, up from a very small figure as recently as a half-dozen years ago. In the case of business schools, I do not have the exact figures, but I understand that between 20 and 25 percent of all those taking the graduate exam for entrance into management schools in this country are women.

This growing role of women in graduate and professional education has a lot to do with Doug Adkin's comments about "push and pull" theories of demand for graduate education. I would suspect that in the case of women minorities, who account for about ten percent of the enrollments of the professional schools, we are dealing with special submarkets that are critical to the overall enrollment figures in graduate and professional education now and in the future. The demand for women and minorities in private enterprise, the professions, and higher education will be with us for some time and the pull of the job market may keep enrollment of these groups in graduate and professional education at high levels throughout the 1980s.

So, my first point would be that graduate and professional education, to a tremendous degree, is a part-time phenomenon; and second, that we are dealing with one of the most fundamental changes in the history of postbaccalaureate education in this country. In the very short time period of a half-dozen years, we have seen women come into this market to a tremendous degree. In fact, I suspect that the leveling off of minority enrollments in graduate and professional education in the last two or

three years may reflect competition from women who have come into this market to such an extraordinary degree.

A second theme I would like to comment about is the use of debt. We may be on the verge again of a large expansion in the use of debt. I think Larry Hough correctly points out that if you want to understand why the Guaranteed Student Loan Program has been on a $1 billion plateau the last four or five years, the answer is the Basic Educational Opportunity Grant Program, which has grown from nothing to $2 billion in a short period of time. During the same period since 1973, state grant programs have grown from modest amounts to $600 million annually; the veterans program, I believe, reached a peak last year of $4.5 billion; the educational component of the Social Security program was over $1 billion; and College Work-Study is up to the point where it is a $400 million program annually. With all these resources the pressure upon borrowing obviously has been eased.

It is true that for the most part, the various programs are directed to undergraduates, but I think it would be incorrect if one implied that they have not had enormous implications for graduate and professional education. Universities are not tightly compartmentalized ships. What happens, at least at private institutions, is that as financial aid pressures on institutions at the undergraduate level are reduced, institutional funds, at least partially, can be redirected toward financial aid needs of graduate students.

We have seen Federal fellowship support drop off dramatically since the late 1960s. The growth of Federal student aid for undergraduates has permitted institutions to use some general funds that traditionally would have gone to undergraduates to meet the needs of graduate and professional students. I am not convinced that the universities in this country are as adept or aggressive in obtaining and using what financial aid funds are available as they should be.

There are two major programs that are directed both at undergraduate and graduate and professional students. One is NDSL, and the other is the College Work-Study Program. If there are two financial aid programs that I think have assured futures, one would be the Basic Grant Program, and the other definitely would be the College Work-Study Program.

Jack Crowley of the Association of American Universities has done some work to show that there are enormous differences in the degree to which universities in this country have used the College Work-Study Program to help meet the financial aid needs of graduate students. The problem, I think, is the Balkanization of graduate schools. At the undergraduate level we usually have a single financial aid director who can apply intelligently for funds for undergraduates. When we get to the graduate level, with many decentralized schools and varying degrees of financial aid sophistication, there is not a general appreciation of the utility of CWSP.

I would like to say something about future costs. There always exists

the temptation to compound numbers and point out that tuition and total cost of attendance ten or twenty years out will be absolutely mind-boggling. It is true, but only if you can compound these numbers. I would point out, however, that every study we are aware of indicates that historically the cost of education, certainly tuition, has remained remarkably stable as a percentage of median family income, discretionary incomes, incomes of families in the age brackets that purchase education or other benchmarks.

I would submit that what happens, whether it is at the undergraduate level or the graduate and professional level ten, fifteen or twenty years out, will probably be affected to a great degree by what is happening in the larger society. Take for example the growing role of women and minorities in graduate and professional education—that did not come from internal decisions of institutions. It came about because of enormous changes and pressures in society.

One thing that I think will affect education and the price structure of education over the period ahead more than anything else is the economic performance of our society. The most dangerous threat to educational institutions, public and private, is inflation. In the private sector it does several things. It increases our costs, and there have been studies to show that we have great difficulty in offsetting such cost increases by sustained increases in productivity. It depreciates the purchasing power of our endowments. It creates enormous expectations on the parts of our faculties and staffs, that we have difficulty meeting, other than by increasing tuition. But it also does something to our consumers. It pushes our consumers into higher income tax brackets. People buy higher education, whether undergraduate, graduate or professional, with after-tax incomes.

I think that any way you want to look at it, when you buy education, there are a couple of things that come first. One is mandatory payments, namely the cost of government at the federal, state, or local level. You have no control over that. Second, there are the necessities; food, clothing, shelter, energy. We have seen enormous increases in these basics. If we have a highly inflationary society into the future, unless we figure out a way to index taxes or to persuade government to take less of the total, then there is simply going to be less for our consumers to use to buy the services of higher education.

So, I would keep that in mind in trying to describe what graduate and professional education will probably look like in the 1980s and 1990s. The inflation rate between now and 1985, more than any other single factor, will determine what higher education will be like a decade hence.

Richard J. Ramsden is Vice President, Administration and Finance at Brown University, Providence, R.I., and formerly Executive Director of the Consortium on Financing Higher Education, a research and consulting consortium of thirty private colleges and universities throughout the United States. He received a M.B.A. from the Harvard Business

School in 1961. Mr. Ramsden became a White House Fellow in 1969-70 and served in the Office of Economic Opportunity, first as Special Assistance to the Director, and then as Deputy Assistant Director for Program Development. In 1973 he was a consultant to the Nine College Study of the Financing of Undergraduate Education sponsored by the Alfred P. Sloan Foundation. Mr. Ramsden is also a Trustee of Brown University and a member of the College Scholarship Service Council.

George A. Russell

Vice Chancellor for Research and Dean of the Graduate School
University of Illinois

I come from a public institution where we are primarily concerned with graduate education, not professional education. As a consequence, our problems are somewhat different, and we see the problems quite differently from the way that they are viewed in the private sector. For many years now, we have been running a graduate program of about 8,000 graduate students. Three thousand of those graduate students traditionally have never been supported. We now have a quota system for restricting graduate enrollment. So whatever the market forces are, the graduate students continue to apply. Moreover, they are as well qualified as they have been in the past.

In 1968, at what was the heyday of Federal fellowships, we had about 2,000 students supported by Federal sources. We now have probably 1,200 to 1,500. This total is for fellowships and research assistantships on contracts or grants. As the tide has shifted, we have picked up those students on state funds. It has meant a re-evaluation of our priorities and the emphasis we place on graduate education. I suspect we have recently placed more state and institutional resources at the disposal of graduate students; this shift probably coming at the expense of undergraduate students.

Now, with that in mind, let me comment on Dave Breneman's paper. I think one of the things that people have not pointed out in the graduate sector is this: there has been little decline in graduate enrollment. Actually, it has increased. There has been little decline in the production of any degree level in graduate education in spite of the very wild fluctuations in Federal support. With one exception, the fall in Federal support seems to have had no impact on degree production.

The one result it has had relates to growth in women Ph.D.'s. David Breneman's statistics are worth repeating. Female Ph.D. degrees increased from 11 percent of the total awarded in 1970 to 23 percent in 1976. In the same time, we had a drop of about three-quarters of the number of Federal fellowships. One might guess that if we pushed the decline of Federal support to the limit, we would get a situation where we would have no sex discrimination at all.

I am troubled about one thing. Like most public institutions I know,

we have a very strong affirmative action program. In recent years, particularly this fall, there has been a drastic decline in the participation in graduate education of minority students, especially Blacks. I am wondering if anybody has looked at—if they have I would like to hear of their studies—the amount of debt incurred by minority students. This may be a factor in the decline of the minority participation in graduate education. If, in fact, it is a factor, we may have found or more appropriately recently exceeded the level of debt to which certain students, maybe many students, will go before they will choose employment rather than graduate education.

I was intrigued by Douglas Adkins's discussion of push and pull models. I believe that they are really asymptotic models, are they not? If you go to one end of the spectrum, you have a push model. If you go to the other end of the spectrum, you have a pull model. Certainly I believe that if you have a situation where there is no demand, there will be no production.

If the demand or pull model is correct, that will become very evident. If the late Allan Cartter's projections concerning our academic needs in the 1980s are correct, then the pull model will be the proper model to plan or anticipate this phenomenon. In the early part of the 1960s, and perhaps all the way through the 1960s, the push model might have been a good one to use, but somewhere in between, we shifted from the supply system to more of the demand system. I think if I am correct, then, perhaps we are somewhere now in between the use of the push model and the pull model. We are searching for something that incorporates both parts of the asymptotic solution.

I agree with Dave Breneman wholeheartedly that the political system will respond to manpower concerns in the 1980s. They will remain dominant, I think, and we should make our plans accordingly, regardless of what all the realities of the system may be. Manpower concerns will certainly control Federal programs as the political system responds to what may be considered an overproduction or a decreased need. On the other hand, I am concerned that for the first time in the history of elementary and secondary education, we could, if society chose, staff our schools in a way that would produce a much better atmosphere for learning.

Yet, we have chosen, rather than to do that, and to make the necessary expenditures, to search for ways to take care of problems by finding new opportunities for graduates of our programs and searching for new ways to support their education. The fundamental problem may well be that we simply have not faced up to the social possibilities of an abundance of qualified people who could, if we chose, reduce classes at the elementary and secondary level, and even in some of the junior colleges to a much smaller size.

In responding to Dwight Horch of the Educational Testing Service, I often hear people refer to the bountiful years. Having been very much involved in those years, I can assure you that they were never bountiful. We look back on them and they were bountiful in comparison. But I

have never known a period in higher education where they were really bountiful years; certainly not in any academic institution with which I have been associated. Most academic institutions that I have known, have been, and will continue to be, not idea-limited, but resource-limited. As a consequence, there is no such thing as a bountiful environment. There are always more and better things you could do if you had more resources.

I agree with Dick Ramsden concerning work-study programs, and I am a little appalled about a recent study that I have conducted to find how little the public sector participates in the work-study program compared to the private sector. Maybe we can participate more in the future.

Finally, I would agree that there is not much public interest in graduate and professional education. I wish the Federal interference were as little as the public interest. If there is anything we need, it is less government interference and less government regulation in higher education.

Dr. George Russell became Vice Chancellor for Research and Dean of the Graduate College of the University of Illinois in 1972. He served in the U.S. Navy, in both operational and research and development positions, from 1940 to 1960. In 1955, he received a Ph.D. in physics from the University of Illinois. Dr. Russell became associate professor of physics at Southern Illinois University in 1960, and in 1962 joined the physics department of the University of Illinois.

George Weathersby

School of Education, Harvard University

I would like to orient my remarks a little bit differently from the previous speakers. I would like to think through what seems to me to be some of the pricing and financing considerations of graduate education.

I think we should start with the issue of pricing policies. How are prices established at the institutional level? By decisions of the institutions or state governments. It is from those decisions that all the need for financial assistance flows.

How do we establish prices in graduate education? Do we establish them in ways that are related to the needs of the labor market? If Dave Breneman's argument is correct that the market forces drive our considerations, we should establish low prices for low market demand fields or maybe high prices for high rate of return fields or some other relationship. I was not shocked when Georgetown and George Washington raised the tuition for students getting a M.D. to something in the order of $30,000 for four years. After all, that is less than the annual difference between the average salary of a M.D. and an American family. That is not surprising as a one-time cost to be made up each year of a working life.

I am also interested in whether or not these pricing policies reflect the cost to the institution of providing the services. Is that the case? Have you looked at the pattern of pricing recently? We often have a pattern where the first year or two of professional education is at one price and a third and fourth and subsequent years are at a vastly reduced price, almost zero. Just at the time that I, as a faculty member, start working with people doing dissertations, I find out that they are paying $350 a year. At the time that I am lecturing to groups of 100 to 200, I find out that they are paying $4,000 a year. It is hard to understand this rationale.

It is important to keep in mind that about 80 percent of all students are in the public sector where the price is based on the difference between government appropriations and desired expenditure levels. It is hard to understand this rationale.

However established, this price is the point of departure for discounting, such as grant assistance, and ultimately for finance. The net price that a person actually pays is the result not only of a gross price (tuition and fees) that is charged on some almost irrational basis, but also the external and somewhat random intervention of the state and Federal gov-

ernment's arbitrary price discounting. Some of the discounting is known by the institution, either through basic grants or institutionally determined awards and some of it is completely unknown to the institution as in many private awards. Some of this price discounting occurs at the discretion of the institution. Some of it does not.

The resulting policy for the net price that individuals pay is largely unknown to our institutions. A favorite ploy of mine is to go to a school and ask to see their net price policy. I have not seen one yet. I say, 'Well, if it is not written down, can you draw me a curve? What do people pay at this institution?' Again, no answer. If we do not know something as simple as the price we charge for our service, then you can understand why students are confused about how they are expected to finance that price.

Given that we have a pattern of discounting, then we must ask: What is the pattern of eligibility for that discounting? How do we go about determining who to give the award to? It used to be easy—it was somebody who could run the 100 yards in under ten seconds, or somebody who played an outstanding oboe. It is harder nowadays because we have moved to an entitlement notion that says a large proportion, but not quite everybody, ought to be eligible. We do not quite know how to draw the line between a large proportion and not quite everybody.

The needs analysis cartel that was described earlier is a pattern of reducing the amount of support to students. It is a way in which institutions agree to limit their awards so as to not get into "gas war" competition with each other. (You recall gas wars. We used to buy gas for 30 cents a gallon.) We have an OPEC in this country. They establish what the price of education shall be not in the interests of the students, but in the interests of the institutions, to limit their price discounts.

The argument about the expectation that parents should contribute to their children's cost of education should work both ways. As an institution, we might make an award on the expectation that a student's family will support him or her. Can the student then turn around and enforce that expectation? The answer is no; of course not. Until we give the rights of suit against his or her parents to the student, we have a legally unenforceable expectation that discriminates against people on the basis of parental willingness—also an interesting pattern of price discounting.

The key we followed is one of entitlement that trades off having an equitable means of support for very inefficient means of accomplishing our objectives. Whatever pattern of eligibility we follow, we end up with a substantial number of people having a gap between the net price they have to pay and their other alternatives. They have to finance that gap in some way.

Unfortunately, we have never developed a means of equity finance in higher education. I say unfortunately because if, let us say, for $10,000 I could buy ten percent of the gross annual earnings of a physician, I

would quickly invest in physicians much more than other equity instruments in our economy. We have not allowed any equity financing. We have, instead, insisted on two other principal forms of finance. One is debt finance and the other is gift support. Education is one of the few areas in the service economy where we expect a large portion of the finance to be made up by gifts, from either parents, relatives, foundations, or philanthropy.

The debt financing is one that is made possible by providing government guarantees, since the use of what is inside our heads as collateral is rather frowned upon. But in a sense what that has done is to make possible funds at a much more modest interest rate than the commercial rate. I normally tell my students that it does not necessarily increase the availability of funds, it only decreases the price of them. Everybody immediately disagrees with that, so I send students out to the bank to apply for a consumer loan of $1,500 with no collateral. At something like 18 to 24 percent interest they are available, but they are more expensive than student loans.

An issue on which I would disagree with Dick Ramsden is the use of College Work-Study as aid. I will agree to that as aid if you will agree that Harvard's salary to me is aid. The idea that if somebody works and the source of the payroll funds is the Federal government and that compensation is to be labeled aid whereas, if the funds were from any other source, would be called employment, is a distinction I do not find helpful.

If anything, College Work-Study is a form of institutional subsidy. It means that with these funds I can employ somebody at 30 cents on the dollar or 40 cents on the dollar rather than using institutional funds to employ the same person for the same task and paying 100 cents on the dollar. That does not affect the money the student receives, but that does affect the price that I have to pay to employ the student. Until we are able to count all income that a person receives as aid, which I do not think it is and I do not think we would be willing to do, then we should not count that income that comes from a particular source into the general fund as aid.

Why are we concerned about these issues anyway? One reason apparently is that we think price or finance affects student behavior. If you have to finance a substantial amount of your net price in the form of debt, as opposed to the form of gift support, then that may affect the individual's choice of whether or not to go to college, what field to enter, or whether to complete a degree program or which career to enter upon completion. Those are all basic arguments we have heard. You notice that those arguments are made without data, because there are very little data to support those arguments. In fact, most of the studies that I have reviewed suggest that these choices at the graduate level are relatively independent of the form of financial support that is available.

We also have been told that if a person should leave owing a debt of gift or owing a debt of loans, that it would affect the kind of motivation

this person would have in his or her career. Somebody owing a substantial amount of debt might turn out to be income maximizing, which is not in the public interest, as opposed to college faculty members, physicians, and others, whose activities are in the public interest. Only, everytime you sit down to collective bargaining negotiations, you have a real sense that income maximization is a large part of their motives as well. I find it very difficult to label it not in the public interest that people are willing to be responsible for the repayment of their debts. That troubles me.

In our current pattern we ask institutions, lenders and students who are not being aided, to subsidize the accomplishment of the national objectives of access and choice in graduate education. It is unclear to me why this current pattern is in the public interest either. Should we not be asking institutions to make straightforward pricing decisions that are related to the objectives of the institutions and should we not be asking students to make straightforward investment and consumption decisions based on the net prices they face and the alternatives that are available? And should we not be asking lenders to make straightforward financing decisions, taking a look at the available money market instruments and prevailing conditions that they face? Instead, we expect all of these people not only to do all of that, but also to accomplish the public objectives of insuring equality of access and opportunity, balancing the labor force, improving the delivery of health care, making sure that lawyers do not have combines, and so forth. It seems to me that that is an unrealistic expectation and an unfair one to place on the enterprise.

The recommendations we have heard of consolidation, of stretchout, and of income contingency are all suggested ways of making the student's life more comfortable, making the repayment process more pleasant, and perhaps enabling people to be more responsible in the repayment of the obligations they have taken on.

Why? Is there evidence that there is a lack of demand for loans at this time, that students are not seeking this aid? Is there evidence of a lack of supply, that people are not willing to make these funds available? Is that what we are trying to deal with? Is there evidence that after commitments are made then people become more responsible and that is what we want to encourage? Do we think people are basically responsible at the time they make the commitments or what? What is the purpose that we have in mind for all these changes and are they in the public interest themselves?

The question about parental loans raises an interesting point. A number of schools have parental loans, some of which are available for multi-year repayments without the existence of a Federal program, and so forth.

Let me stop and recapitulate; what I am saying is that we ought to look at finance, not in the sense of subsidy, but in the sense of the means of providing the funds for the net price that remains. But to understand

finance, we have to understand pricing, and the set of incentives that revolve around that. Let me give you a simple example.

Right now it is generally less expensive in terms of net price for a student to go to an Ivy League institution than it is to go to a community college. It is not clear that that is the public interest but that is the public policy that we have at this time. I can go through similar examples of graduate instruction at a public institution or a private institution. It is currently less expensive for someone in a low income group to attend graduate instruction in a private institution than it is in a public institution. We have a set of net pricing policies that are not the conscious result of open debate, that are not generally known, and that lead to not only counter-intuitive but often counter-productive results.

The issue of finance, not of subsidy, and not of aid, but the issue of finance is an issue of how to deal with the gap between the net price and a person's current resources. At that point I think we need to be much more direct, overt, and separate in dealing with the issue of finance as separate from the issue of aid.

Dr. George Weathersby is Commissioner for Higher Education for the State of Indiana and an Associate Professor at Harvard University's Graduate School of Education. Dr. Weathersby studied at the University of California at Berkeley, where he received a B.S. in Engineering-Physics in 1965, a M.S. in Nuclear Engineering in 1966, and a M.B.A. in Managerial Economics in 1967. In 1968 he received a S.M. and in 1970 a Ph.D. from Harvard University in Decision and Control. Dr. Weathersby has served as Director of the Ford Research Program in University Administration of the University of California, and as Director of Research of the National Commission on the Financing of Postsecondary Education. He joined the faculty of Harvard University in 1974. Dr. Weathersby has served as a consultant to the U.S. Department of State, the Office of Education, the National Institute of Education, the National Commission on the Financing of Postsecondary Education, several state budget or higher education agencies, and a number of universities and colleges, including Barnard College, Ohio University, and the University of California.

James A. Mau
Associate Dean, Graduate School
Yale University

One of the issues that concerns us is whether the best students are continuing to go to graduate schools of arts and sciences or indeed, whether the best students are continuing to go on to postgraduate education at all. It seems to me that a companion issue that we must address in the interest of efficient use of our educational resources, and in the interest of equitable distribution of opportunities for access to those resources, is whether the best students are continuing to have opportunities to go to many of the high quality graduate or professional schools. In other words, what have the impacts been, however unintended or unanticipated, of various cuts made in uncoordinated ways as a result of various programs?

For example, has there been any national concern or attention by Federal education agencies to the impact of the various efforts undertaken to control the size and number of graduate programs such as those undertaken by the State of New York. Or, for example, has sufficient attention been given to the fact that a number of high quality graduate schools of arts and sciences independently reduced their Ph.D. enrollments because of their own financial problems or because of their own educational plans, prior to most of the cutbacks in various support programs.

I have been told that the graduate school of the arts and sciences at Harvard University chose some years ago, for reasons other than purely economic ones, to reduce the number of graduate students in each entering class over a five-year period and to reduce the number of Ph.D.'s awarded. Similarly, the Yale University Graduate School in 1970 chose to reduce the size of the entering class by 30 percent, not because of an anticipated Ph.D. glut, but rather because we were facing financial problems that we are still facing. We now have a class of 475 entering the graduate school of arts and sciences, whereas in 1969 we had an entering class of 700.

I wonder, therefore, about the unanticipated national consequences of the actions of individual graduate schools, whether private or public and the actions of state legislatures that affect the nationwide output of Ph.D.'s, not simply in numbers—because we have studies on the numbers, and we have reason to be concerned about that—but in the distribution of quality. Frankly, it seems to me to be a question of

whether those of us in graduate education are doing what we do best or are we encouraging a national policy that proliferates new degree programs at new and smaller institutions because of the demands of the faculties in those institutions?

With a lack of cohesive national policy for financing graduate education, and in the absence of a radical restructuring of the economics of education, it seems to me that in the short run we have to focus on some of the issues we would otherwise put aside. We have to be concerned about inequities and inefficiencies. We have to be concerned about subsidies.

As it is now, in many high cost graduate schools such as Yale, we are seeing a process that leads to increased enrollments of students from higher income families. This is necessarily the case since we can find financial support for a smaller and smaller number of students who are entering the graduate school. Students from middle income families are reduced proportionately in number by the pressure created by the lack of funds to meet their expenses. We are, of course, attempting to keep tuition down in order to attract students and make it possible for them to attend at a time when roughly one-quarter to one-third of the students are paying their own way. In doing so, in the fashion described by George Weathersby, they provide a subsidy to other people who cannot afford to pay their own way.

Grants and loans and the issues of extended repayment, vairable term loans, graduated repayment, and the problem of accumulated debts are all issues we need to focus on.

It seems to me that in the Councils of Deans I have encountered in the last couple of years, I have found acknowledgement of a need for truth-in-packaging in education. I would hope that you would understand their reluctance, however, to encourage students to consider going to law school or medical school rather than graduate schools of arts and sciences. But, indeed, in our own admissions brochure, to mention one example, there is a message from the dean that begins, "Why should anyone want to enter graduate school in 1977? Haven't you heard of the Ph.D. glut?" The dean's message then goes on to examine the issues. It had very little effect on the total number of applications, but I think that it did discourage some applications in the humanities disciplines.

Students do pay attention to their own interests in pursuing careers. I think they do look at the income maximization issues as suggested by George Weathersby. But, unfortunately for manpower considerations and for various push or pull models, students often pay little attention to what I think some of you would argue should be conclusive evidence and decide to pursue their educational interests for their own idiosyncratic reasons.

My experience as a dean serving on the GAPSFAS Council suggests that we should indeed look for the unlocking of data that Kurt Kendis called for. GAPSFAS data are limited despite the fact that we have access to large quantities of information about student finances and the

economics of the families of students. It is unfortunately a selected population biased in various ways. It would be helpful to have data available that do not carry the kinds of sample biases that our data necessarily carry, in order to provide the research required to answer many of the questions that have been brought forth here. I would hope that on a national level, dealing with national data, many of these questions raised could be answered more conclusively.

Dr. James A. Mau has served as Associate Dean of the Graduate School of Yale University since 1970. He received a Ph.D. in sociology from the University of California at Los Angeles in 1964, and joined the Yale sociology department later that year. Dr. Mau is also a member of the executive committee of the Graduate and Professional School Financial Aid Council and the National Coalition for Coordination of Student Financial Aid. Effective January 1, 1978, Dr. Mau will become Dean of the College of Arts and Sciences at Florida International University in Miami.

SELECTED WORKING PAPERS OR PUBLICATIONS OF THE SYMPOSIUM SPEAKERS

I. DR. DAVID BRENEMAN

A. *Public Policy in Higher Education.* Forthcoming Brookings Institution Publication (Co-Editor).

B. *Efficiency in Graduate Education—An Attempted Reform.* Ford Foundation Report.

C. *Effects of Recent Trends in Graduate Education—Physics, Chemistry and Mathematics in University Research Productivity.* Forthcoming.

D. *Graduate School Adjustments to the New Depression in Higher Education.* Washington, D.C.: Technical Report on the National Board on Graduate Education, 1973.

II. DR. DOUGLAS ADKINS

A. *The Great American Degree Machine: An Economic Analysis of the Human Resource Output of Higher Education.* Carnegie Commission on Higher Education, 1975.

B. *Demand and Supply in U.S. Higher Education.* McGraw-Hill, 1975 (with Roy Radner, Leonard S. Willis, Frederick E. Balderson).

C. "The American Educated Labor Force" in *Higher Education in the Labor Market,* Margaret S. Gordon (Ed.). McGraw-Hill, 1974.

III. MR. DWIGHT HORCH

A. *Financial Aid Planning Model Technical Manual.* Princeton, New Jersey: Educational Testing Service, April, 1976.

B. *Measuring the Financial Status of Graduate and Professional Students.* Princeton, New Jersey: Educational Testing Service, November, 1974, (with J. L. Bowman).

C. *How College Students Finance Their Education: A National Survey of the Educational Aspirations, Interest and Finances of College Sophomores in 1969-70.* Princeton, New Jersey:

Educational Testing Service, January 1972, (with E.W. Haven).

IV. DR. STEPHEN DRESCH

A. "Human Capital and Economic Growth Retrospect and Prospect" in *Human Capital*, Volume II of *U.S. Economic Growth 1976-1986: Prospects, Problems and Patterns*. Washington, D.C.: Joint Economic Committee; General Printing Office, 1976.

B. "New Directions for Higher Education: Management of Turbulence and Change" in *Higher Education*. San Francisco: Jossey Bass Publishing Company, August 1977.

C. "A Critique of Planning Models for Postsecondary Education: Current Feasibility, Potential Relevance, and a Prospectus for Further Research" in *Journal of Higher Education*. Vol. XLVI, No. 1, May/June, 1975.